DEFENCE 87

National Defence / Défense nationale

DEFENCE 87

Ce livre est aussi disponible en français.

The Minister, Perrin Beatty, prior to take-off in a CF-18 during a visit to Northern Canada.

IBVC87-244 by Sgt D Mahl

The Associate Minister, Paul Dick (left) visiting soldiers of the Special Service Force during Rendezvous 87.

FOREWORD

1987 was an important year in the history of Canada's defence. The men and women of the Canadian Forces had the opportunity to review their role as an armed force in today's modern and challenging times. Every assumption and every scenario was examined against Canada's ability to fulfil its self-assigned roles. The conclusions were arrived at after discussion and consultation, manoeuvres and exercises and a high degree of debate and scrutiny.

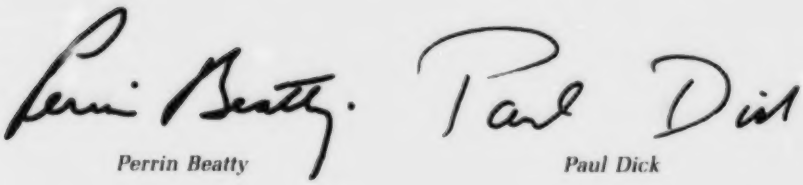
The result was the White Paper — *Challenge and Commitment: A Defence Policy for Canada* — which gave the Canadian Forces its first new mandate in 16 years. It is a strong policy that will

revitalize our defence capabilities into the 21st century. The plan to modernize our Forces will ensure that Canadians play a responsible role in the defence of Canada, and contribute in a meaningful way to the alliance of democratic nations.

The White Paper challenges the men and women of the Canadian Forces and the Department of National Defence. It also challenges all Canadians. As a nation, we must be responsible to ourselves and our children to safeguard our freedom and pursue world peace.

Defence 87 details the main activities of the Department throughout 1987 and highlights the early stages of White Paper implementation.

We hope that this book will provide Canadians with a clear understanding of our Government's commitment to the defence of our nation's sovereignty and security.



Perrin Beatty *Paul Dick*

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PARLIAMENT AND NATIONAL DEFENCE

The Governor General of Canada, Her Excellency Madame Jeanne Sauvé, as the Sovereign's representative, is Commander-in-Chief of the Canadian Forces.

Parliament, through the National Defence Act, created the Department of National Defence headed by a minister appointed by the Prime Minister.

The Minister of National Defence and the Associate Minister of National Defence are accountable to Parliament for all matters relating to national defence, including the formulation and implementation of defence policy.

IISC87-380 by WO V. Johnson

National Defence Headquarters, Ottawa.

The House of Commons Standing Committee on National Defence (SCOND) reviews and makes recommendations on policies and programs concerning defence. SCOND also examines estimates submitted annually by the Department of National Defence.

The Special Committee of the Senate on National Defence reviews and influences the development of Canadian defence policy.

Cabinet Committee on Foreign and Defence Policy

The Minister of National Defence is vice-chairman of the Cabinet Committee on Foreign and Defence Policy. This committee, headed by the Secretary of State for External Affairs, is comprised of 19 members who formulate policy on foreign and defence issues.

National Defence Headquarters

The Minister of National Defence, Perrin Beatty, is charged with the control and management of the Department of National Defence, including the Canadian Forces. The Minister has shared responsibilities with the Associate Minister of National Defence, Paul Dick.

The Deputy Minister, Mr. D.B. Dewar, is the senior civilian adviser to the Minister and the Associate Minister. He is responsible for ensuring that all policy direction emanating from the government is reflected in the management of DND. The Deputy Minister draws his authority principally from the Interpretation, Financial Administration and Public Service Employment Acts. The Interpretation Act empowers the Deputy Minister to act for the Minister regarding departmental responsibilities. The other acts charge the Deputy Minister with specific responsibilities for financial administration as a whole and for personnel administration of civilian employees.

The Chief of the Defence Staff, General Paul Manson, is the senior military adviser to the Minister of National Defence and the Associate Minister of National Defence. Charged by the National Defence Act with control and administration of the Canadian Forces, he is responsible for the effective conduct of military operations and for the readiness of the Canadian Forces to meet the commitments assigned by the government.

DIRECTION OF DEFENCE

On June 5, 1987, the Minister of National Defence, the Honourable Perrin Beatty, tabled in the House of Commons a White Paper on defence entitled *Challenge and Commitment: A Defence Policy for Canada*. This document contains the results of an extensive defence review carried out by the Government and represents the most comprehensive statement on defence policy in sixteen years.

Canadian security policy has three major elements: defence and collective security, arms control and disarmament, and the peaceful resolution of disputes. The Department of National Defence and the Canadian Forces support that security policy by their contributions to strategic deterrence, conventional defence, sovereignty, peacekeeping and arms control.

HMCS Algonquin and HMCS Protecteur entering port at Lisbon, Portugal after Exercise Open Gate 87.

Strategic Deterrence

The principal direct threat to Canada is a nuclear attack on North America by the Soviet Union. To discourage such an attack, Western nations rely upon a strategy of deterrence based on diversified nuclear forces. These forces must be able to survive an attack and retaliate in a manner that will convince any potential aggressor that the penalty he risks far outweighs any gain he might achieve.

A Kiowa pilot of 444 Tactical Helicopter Squadron during a routine mission over southern West Germany.

Canada has no nuclear weapons and no intention of acquiring them. To deter a Soviet nuclear attack on Canada, we rely on the strategic nuclear retaliatory forces of our principal ally, the United States. We contribute to deterrence by helping defend these retaliatory capabilities, notably through the North American Aerospace Defence Command (NORAD).

Conventional (Non-Nuclear) Defence

Soviet conventional forces also threaten Canadian security. Although this threat is most evident in Central Europe, where Warsaw Pact forces outnumber those of NATO, it also exists wherever else Canadian interests and Soviet military capabilities overlap: at sea, in the Pacific, the Atlantic and the Arctic, and in the air over the approaches to North America.

To counter the conventional threat requires adequate numbers of properly trained and equipped conventional forces. It may not be necessary to match the other side soldier-for-soldier and weapon-to-weapon, but by increasing the effectiveness of our conventional forces and their ability to fight over an extended period, we can reduce our reliance on nuclear weapons.

A CF-18 fighter from 425 Tactical Fighter Squadron intercepts a Soviet Bear bomber off Canada's East Coast. This bomber is capable of carrying cruise missiles.

In an era of increasingly complex and costly weapons, credible conventional defence requires that all members of NATO contribute to collective security. Canada plays its part through naval forces in the Atlantic and the Pacific, through land and air forces at home and in Europe, and through NATO's common funded programs.

Sovereignty

After the defence of our country itself, there is no issue more important than protecting our sovereignty. The military is called upon when the civil authorities are unable to enforce Canadian laws and regulations or when Canada's jurisdiction is challenged by other states.

The Government will not allow Canadian sovereignty to be diminished. It will ensure that the Canadian Forces are able to operate anywhere within Canadian jurisdictional limits.

Peacekeeping

Canada has a respected record in peacekeeping and a proven competence in helping settle disputes. Canadians have participated with distinction in every United Nations peacekeeping operation since the end of the Second World War.

Our continued support for the United Nations' quest for global peace makes an important contribution to world stability and therefore to Canadian security.

Arms Control

Arms control and defence are mutually supporting elements of Canadian security policy. The policies pursued in each area share the common goal of increased security and stability at the lowest level of forces. The Department of National Defence works closely with the Department of External Affairs in formulating arms control proposals, in consulting with our allies, and in negotiating agreements.

The Way Ahead

On the basis of its defence review, the Government has decided to consolidate some commitments to make more efficient use of available resources, while improving the effectiveness with which the remaining commitments are carried out. Defence spending will be increased sufficiently to help the Canadian Forces respond to the challenge of the 1990s and beyond.

Canadian defence policy will continue to be based on collective security within the North Atlantic Alliance, including the continental defence partnership with the United States. Canada will

(BA887-815-4 by Mcpl R. Marcoux)

A Canadian soldier is briefed by a Swedish soldier in Cyprus. Canada's commitment to peacekeeping was increased this year when the Swedish government withdrew their contingent.

participate in collective deterrence and defence in North America, in Western Europe and at sea. Canada's contributions to peace and security will not stop there, however. In the pursuit of a more peaceful world, the Canadian Forces will rededicate themselves to resolving regional conflicts through peacekeeping. The Department of National Defence, with the Department of External Affairs, will continue the search for effective arms control which will enhance security and stability while lowering the level of armed forces.

In charting the way ahead, the Government will take a number of new initiatives. These changes will serve both national and alliance requirements. Collectively, they will significantly increase the overall effectiveness of the Canadian Forces.

The navy will be provided with modern, capable vessels for operations in the three oceans which border our country: the Atlantic, the Pacific and the Arctic. Our capacity for surveillance and defence of Canadian territory will be bolstered. The Reserves will be revitalized and enlarged to assume a greater role, both in the defence of Canada and in supporting and sustaining our overseas commitments. Our land and air commitments in Europe will be consolidated on the central front to provide a credible and more readily supportable Canadian contribution. These

intiatives, combined with what is already being done, will eventually produce the best affordable force structure and a military capability to meet our commitments effectively. With these changes, Canada will become a more responsible partner. We will be more honest with our allies, with our citizens, and with the men and women of the Canadian Forces who risk their lives in our defence.

(Courtesy of The Reservist)

A Lorne Scot corporal during infantry tactics training.

DEPARTMENTAL ESTIMATES AND EXPENDITURES

Soldiers fording a river using Grizzlys during Rendezvous 87.

(RVC87-0060, by Sgt Dennis Mah)

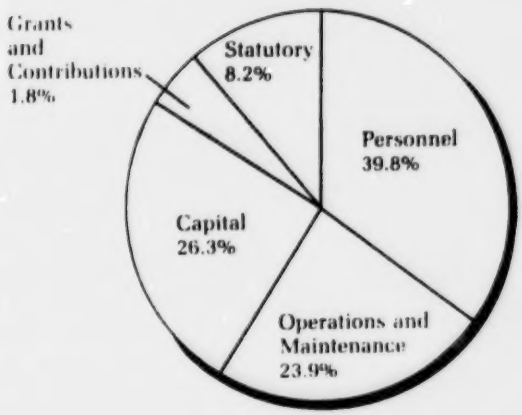
FISCAL YEAR 1987-88

The 1987-88 Department of National Defence Main Estimates of $10,340 million represents 9.4 per cent of the budget of the Government of Canada. This also represents an increase of $467 million over the 1986-87 actual expenditures.

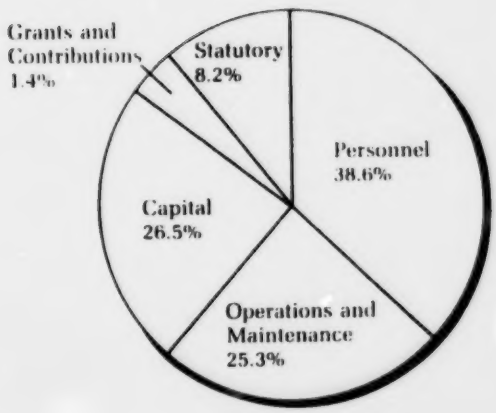
A comparison of the main estimates and actual expenditures by component for fiscal years' 1986-87 and 1987-88, is displayed in the following charts.

DEPARTMENTAL ESTIMATES AND EXPENDITURES BY COMPONENT

Actual Expenditures 1986-87

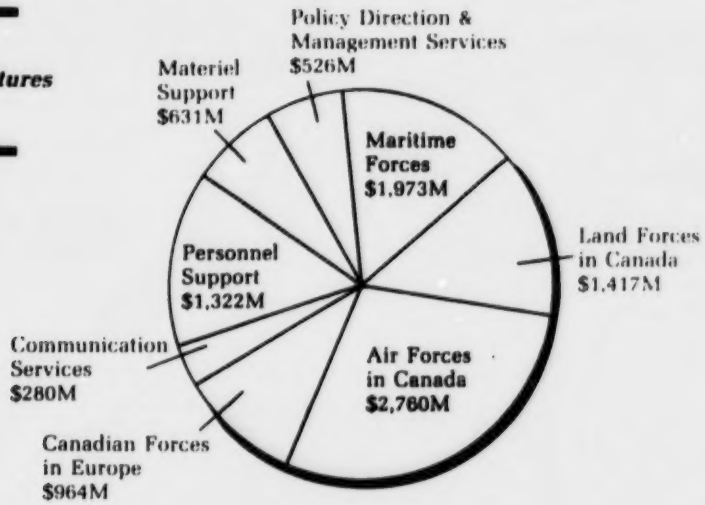


Main Estimates 1987-88

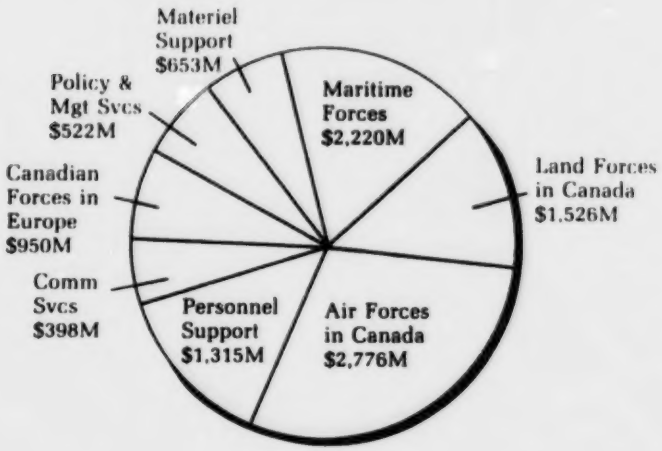


DEPARTMENTAL ESTIMATES AND EXPENDITURES BY ACTIVITY

Actual Expenditures 1986-87


Policy Direction & Management Services $526M
Materiel Support $631M
Maritime Forces $1,973M
Land Forces in Canada $1,417M
Personnel Support $1,322M
Communication Services $280M
Air Forces in Canada $2,760M
Canadian Forces in Europe $964M

Main Estimates 1987-88


Materiel Support $653M
Policy & Mgt Svcs $522M
Maritime Forces $2,220M
Land Forces in Canada $1,526M
Canadian Forces in Europe $950M
Comm Svcs $398M
Personnel Support $1,315M
Air Forces in Canada $2,776M

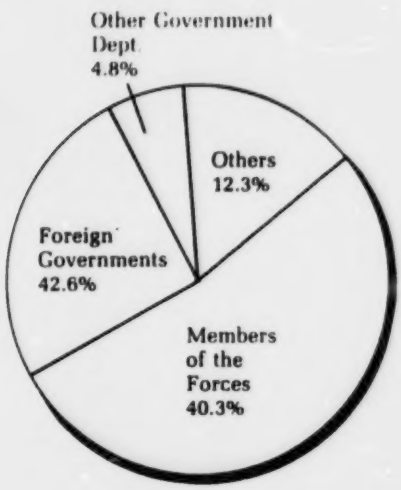
NOTE: The financial data reflected above includes expenditures incurred by individual budget managers as well as an allocation of expenditures incurred centrally such as pay and capital items. The budget data shown later in the command sections reflect only locally controlled expenditures and will therefore be less than the amounts shown above.

REVENUE

Certain departmental expenditures in the fiscal year 1987-88 will be offset by revenue recovered for the provision of services, materiel and facilities to agencies internal and external to DND. For example, DND derived revenue from rentals of quarters for married and single personnel, rations and clothing charges, certain medical and educational cost and assistance to provinces and other government departments. In addition, revenue is collected from foreign countries for the use of DND facilities.

In the fiscal year 1987-88, the department expects to collect on behalf of the Receiver General, approximately $327 million from various sources.

Sources of Revenue 1987-88



NATO CONTRIBUTIONS AND MUTUAL AID

In addition to the cost of maintaining operational forces in Europe, Canada also contributes to NATO by sharing the costs of various common-funded programs. These programs include the NATO Common Infrastructure Program, the NATO Military Budget and the NATO Airborne Early Warning and Control (NAEW&C) Program. The NATO Common Infrastructure Program provides capital funding for a wide-range of common-use military installations and facilities while the NATO Military Budget Program funds the operations of NATO-integrated military headquarters and agencies.

Canadian contributions to these programs have increased from $30 million in the fiscal year 1977-78 to $151 million in 1986-87. Canada also participates actively in several cooperative armaments projects with various NATO members. These projects are pursued through collaborative arrangements for equipment research, development and production in order to minimize costs and duplication of effort, while ensuring maximum standardization and project interoperability.

(IWC87-0581)

An M109 A3 Self-Propelled Howitzer. Canada's Armed Forces is equipped with three regiments of M109 SP Howitzers.

The Department of National Defence has, since 1950, provided financial, training and material aid, totalling $2.1 billion or an equivalent $11.5 billion in 1987-88 dollars. Canada has also supported, in the NATO Defence Planning Committee, the need for continuing military aid to NATO's southern flank nations (Greece, Portugal and Turkey), to allow these countries to adequately fulfil their responsibilities to the alliance.

During 1987, the Canadian government continued to provide logistics support for the CT-133 *Silver Star* and CF-104 *Starfighter* aircraft previously transferred to Turkey. During the year, Canada also transferred to the Greek government a quantity of CF-104 spare parts from the Canada-based aircraft inventory. As well, Canada confirmed its commitment to supply the government of Portugal with three complete sets of sonar equipment for the Portuguese Frigate Program.

DND SHARE OF THE FEDERAL DOLLAR

The following table provides a 10-year summary of DND's share of the federal budget in terms of budget-year dollars, except for the figures in brackets which are stated in 1987-88 constant year dollars.

Fiscal Year	Gross Domestic Product ($ Millions)	Federal Budget (Main Estimates) ($ Millions)	DND Budget (Main Estimates) ($ Millions)	DND Share of Federal Budget (Percentage)
1978-79	243,976	46,476	4,128 (7,328)	8.9
1979-80	277,222	50,768	4,375 (6,971)	8.6
1980-81	312,712	57,862	5,049 (7,235)	8.7
1981-82	348,936	63,974	5,907 (7,667)	9.2
1982-83	369,858	72,935	7,041 (8,354)	9.7
1983-84	403,609	85,618	7,840 (8,910)	9.2
1984-85	440,347	94,554	8,767 (9,692)	9.3
1985-86	472,087	102,531	9,383 (10,032)	9.2
1986-87	501,944	107,008	9,955 (10,343)	9.3
1987-88	521,520	110,141	10,340 (10,340)	9.4

RATIO OF DEFENCE ACTIVITIES OF NATO COUNTRIES

Defence Expenditures as a percentage of the Domestic Product in 1986		Armed Forces as a percentage of the Labour Force in 1986		Per Capita Defence Expenditures in 1985	
Greece	7.1	Greece	6.1	USA	1114
USA	6.7	Turkey	4.6	UK	448
UK	5.3	France	3.0	Norway	433
Turkey	4.5	USA	2.9	France	376
France	4.1	Belgium	2.9	Federal Republic of Germany	327
Norway	3.3	Portugal	2.8	Canada	292
Federal Republic of Germany	3.2	Italy	2.5	Netherlands	275
Portugal	3.1	Federal Republic of Germany	2.4	Belgium	273
Netherlands	3.1	Norway	2.3	Denmark	254
Belgium	3.0	Netherlands	2.3	Greece	234
Italy	2.7	UK	2.0	Italy	166
Canada	2.2	Denmark	1.4	Luxembourg	107
Denmark	2.2	Canada	1.0	Portugal	61
Luxembourg	1.1	Luxembourg	0.9	Turkey	46

NOTE: Defence expenditures include expenditures of other government departments which qualify under the definition of NATO defence expenditures.

NATIONAL OPERATIONS

Two boatswains, crewmen aboard HMCS Nipigon, prepare to tie the ship up alongside HMC Dockyard at CFB Halifax.

(HSC87-0078-119 by MCpl P. Forget)

INTRODUCTION

National Operations range from meeting international military commitments to providing specialized assistance to civilian organizations. Broad direction is provided from National Defence Headquarters (NDHQ) with specific execution being assigned to the various commands and regions of the Canadian Forces. The Deputy Chief of Defence Staff directs, monitors and coordinates National Operations on a continuing basis through the National Defence Operations Centre (NDOC) at NDHQ. This section describes briefly those operations which affected more than one command or only one command in more than one area of Canada. The chapters for each command provide further details for some of these operations.

ASSISTANCE TO OTHER DEPARTMENTS, CIVIL AUTHORITIES AND CIVILIAN ORGANIZATIONS

During 1987 the Canadian Forces provided military honours and logistics support for the royal visits of Her Majesty the Queen, His Royal Highness Prince Philip, Her Majesty the Queen Mother, His Royal Highness Prince Edward, and the Duke and Duchess of York as well as the state visits of the President and the Prime Minister of France, the Prime Minister of Italy and the President of the United States of America.

Support was provided for the pastoral visit of Pope John Paul II, 11 other VIP visits, the Second Francophone Conference, the Commonwealth Heads of Government Meeting, and the Canada Winter Games.

Humanitarian airlift missions were tasked on 19 occasions for relief operations in Third World Nations.

Assistance was provided to other government departments, civil authorities and civilian agencies throughout the year with noteworthy examples that included:

- an air and sea search for refugee vessels off the Atlantic Coast and the detention of 174 Sikh refugees at CFB Halifax in support of Employment and Immigration Canada;
- troop deployments to aid police forces in searches for missing persons at Atikoken, Ont.; Bedford, N.S.; Fredericton, N.B.; Hay River, N.W.T.; Sydney, N.S.; Ste-Agathe du Mont, Que.; and Summit Lake, Y.T.;
- air evacuations, security services and traffic control during fire-fighting operations in Northern Ontario;
- airlift of 10 tonnes of forest fire-fighting equipment to China in support of the Canadian International Development Agency;

- emergency transportation for doctors, nurses and medical supplies during severe blizzards at Winnipeg and Charlottetown;
- assistance during the flooding of the St. John River at Perth-Andover, N.B.;
- air deployments of the RCMP Special Emergency Response Team;
- maritime patrols in support of the Department of Fisheries and Oceans; and
- provision of bomb disposal teams to assist police forces in the identification of suspicious packages.

SEARCH AND RESCUE

The Minister of National Defence is responsible for the conduct of the National Search and Rescue (SAR) program and receives

A Search and Rescue CH-113 Labrador near Trenton, Ont.

independent support from the National Search and Rescue Secretariat. The Canadian Forces also jointly sponsors the Civil Air Search and Rescue Association (CASARA) with Transport Canada. More than 7,000 volunteers and over 1,400 private aircraft have been made available to Rescue Coordination Centres (RCC) through CASARA. The training of CASARA members in search procedures was conducted at numerous regional centres during the year by liaison officers and personnel from Canadian Forces Search and Rescue Squadrons.

SAR Incidents 1987

Rescue Coordination Centres responded to a total of 9,353 incidents, compared to 8,309 in 1986. Of these 1,099 were air incidents, 7,415 were marine related and 839 involved assistance to civil authorities.

There were several major air searches in 1987, although no particular incident involved large numbers of victims. CASARA volunteers and aircraft were utilized on numerous occasions, significantly enhancing the coverage of large search areas in minimum time. Many small incidents were handled quickly and successfully because of early reporting and detection aided by SAR satellites and emergency locator signals.

One incident, SAR *Ladouceur*, was particularly demonstrative of the value of civilian volunteers when the crash site of a missing plane was quickly located by a CASARA aircraft, and two slightly injured survivors were subsequently picked up and transported to hospital by another, float-equipped civilian aircraft.

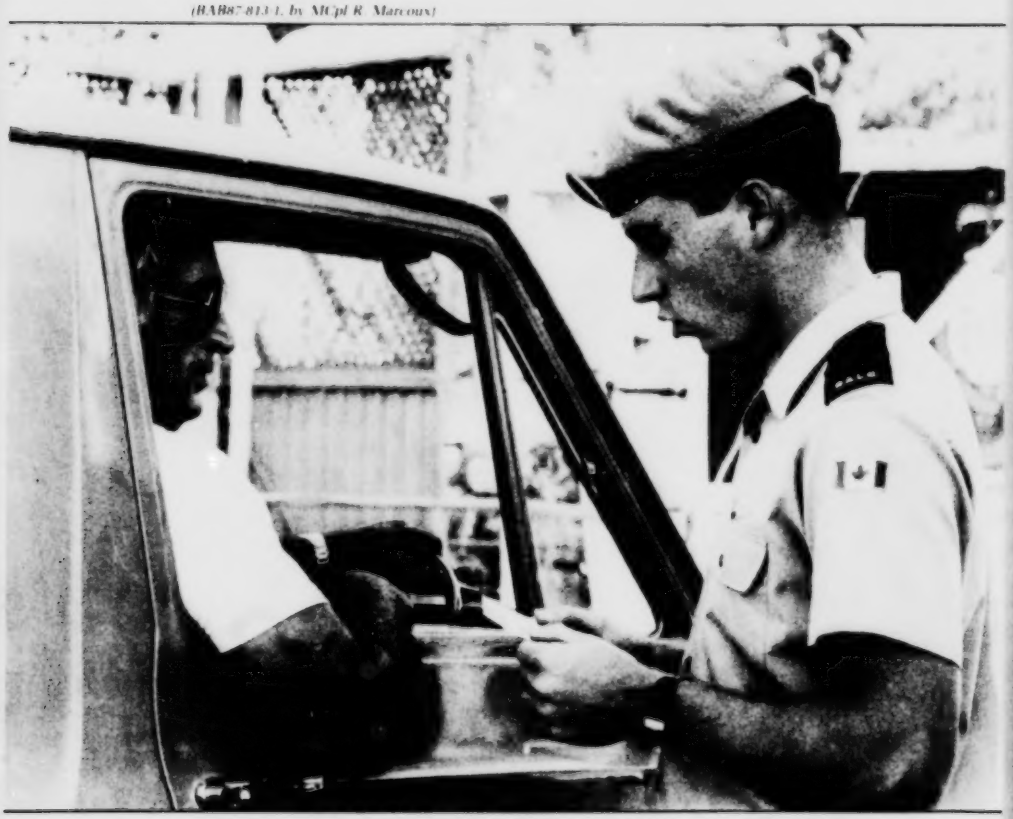
The Canadian Mission Control Centre (CMCC) in Trenton, Ont. is responsible for the coordination and processing of SAR satellite (SARSAT) data. The CMCC was awarded the 1987 Mynarski Trophy by the Royal Canadian Air Force Association, recognizing it's outstanding contribution to Search and Rescue by annually handling over 10,000 SARSAT inquiries and alerts. During the 12 months preceding June 1987, CMCC Trenton supplied data assisting in 18 rescues and the saving of 44 lives.

PEACEKEEPING

Canada remains one of the principal contributors to world peace through United Nations (UN) operations. Currently 974 personnel are serving in four areas. Canada's largest contingent is 575 soldiers serving in Cyprus. In the Middle East the Canadian Forces continue to participate in the UN Truce Supervisory Organization and the UN Disengagement Observer Force. Twice yearly Canada also provides a *Hercules* aircraft to assist the UN Military Observer Group in India and Pakistan. For the Multinational Force and Observers (MFO) in the Sinai, Canada

provided a 129-member Rotary Wing Aviation Unit plus eight staff officers to the MFO Headquarters.

(BAB87-813-1, by MCpl R. Marcoux)



A Gunner of 5e RALC, on duty with UNFICYP, checks the identity papers of a Cypriot civilian about to enter the main Canadian camp, Wolseley Barracks, near the centre of Nicosia.

INTERNATIONAL CO-OPERATION

During 1987 the Canadian Forces co-operated with a number of countries in carrying out training exercises and other activities.

Twenty-four German battalions each underwent three weeks of intensive training with live ammunition at CFB Shilo, Man.

Two vessels of the Dartmouth Training Squadron, Royal Navy, visited Canadian ports in the Great Lakes during May.

Seven battle groups of the 1st British Corps, based in the Federal Republic of Germany, each spent four weeks carrying out mechanized live firing and manoeuvre training in CFB Suffield, Alta., while three air transportable battalion groups of the United Kingdom Land Forces each trained for four weeks at Camp Wainwright, Alta., and a squadron of Royal Engineers from the United Kingdom trained at CFB Gagetown, N.B., for six weeks.

Five nations now conduct tactical low-level flying training at Goose Bay, Nfld. Units of the Canadian Forces, United States Air Force, Royal Air Force, German Air Force and the Royal Netherlands Air Force flew approximately 10,000 sorties this year.

In addition, British personnel from all three services conducted adventure training in the Rocky Mountains and elsewhere in Canada.

A task force based on the 1st of the 58th Infantry Battalion from Fort Benning, Georgia, consisting of 1,000 personnel and 330 vehicles, including tanks, participated in Mobile Command's *Rendezvous 87* concentration at Wainwright, Alta.

The 94th U.S. Army Reserve Command conducted annual training at CFB Gagetown in August. Approximately 4,300 personnel, 1,000 vehicles and 20 helicopters used the Gagetown training area for two weeks.

A Canadian contingent participated in a command post exercise with the other ABCA (Australian, British, Canadian and American) nations at Fort Ord, California, during November, in order to practise interoperability.

The Bermuda Regiment trained thirty junior non-commissioned members in CFB Valcartier, Que., during July.

Platoons from the 2nd and 3rd Battalions, The Royal Canadian Regiment, participated in tactical evaluation training with the U.S. Army in April and May.

A platoon of the Canadian Airborne Regiment took part in parachute training with the French Army at Pau, France, in April.

Exchange training took place between:

- 5e Régiment Génie du Canada and 19e Régiment Génie of the French Army, in June;
- 2nd Battalion, The Royal Canadian Regiment and the 2nd Battalion, The Jamaica Regiment, in October; and
- 12e Régiment Blindé du Canada and 8e Régiment du Hussard of the French Army, in October.

Canadian, U.S. and RAF tactical air crews were exercised together at CFB Cold Lake, Alta., from April 25 to May 23 during Exercise *Maple Flag XIX*, which included participation by NATO Airborne Early Warning aircraft. *Maple Flag XX*, the second of these biannual tactical air training exercises, was held from September 12 to October 10.

The United States Air Force continued testing the Air Launched Cruise Missile (ALCM) in the Canadian North. This was the fourth year of the test program. The cruise missile tests were conducted under the 1983 Canada-United States Test and Evaluation Agreement which allows the U.S. Department of Defence the use of Canadian Forces facilities and Canadian airspace for such testing.

MILITARY TRAINING ASSISTANCE PROGRAM

The Canadian Forces continued to provide training in Canada for military personnel of developing countries, and to send training advisors abroad. During 1987 more than 48 military personnel from countries in Africa, the Middle East and the Caribbean trained in Canada.

ARMX

From June 3 to 5, the Armed Forces Training Technology Exhibition (ARMX) was run by Defence Publications Limited, the publisher of *Canadian Defence Quarterly*.

The aim of ARMX was to demonstrate to commanders, their staffs and users, the latest training devices and future developments in the field. ARMX 87 also informed industry of the Canadian Forces training equipment requirements and DND procurement procedures.

JOB CREATION — YOUTH DEVELOPMENT

DND continued to participate in federal government training and employment initiatives with numerous programs designed to assist young Canadians in the transition from school to the work-force.

The Summer Youth Employment Program

Funded jointly by the Department of National Defence, which contributed $3.7 million, and Employment and Immigration Canada, the $13.5-million 1987 Summer Youth Employment Program (SYEP) enrolled about 6,800 students and 550 non-students for Primary Reserve and cadet units. Students in the SYEP cadet program served as cadet instructors at 26 camps across Canada. This enabled 5,000 more cadets to attend summer camps.

Other Summer Programs

In 1987, DND funded a Student Summer Employment Program which, with an expenditure of $5.1 million, provided 1,781 professional, technical, clerical and manual-labour jobs at Canadian Forces bases and stations across Canada.

Other Employment Programs

The Co-operative University Employment Program, funded at $1.7 million, employed about 125 students in work related to their studies. During 1987, the Civilian Temporary Employment Program (CTEP), funded at $24 million, provided about 1,400 jobs of six months or less duration in the DND civilian work-force.

CADETS

During 1987 approximately 22,000 cadets participated in activities directed principally by officers of the Cadet Instructors List (CIL) and by staff cadets.

The Department of National Defence is involved, together with the Navy League of Canada and the Army and Air Cadet Leagues, in operating and supporting cadet organizations for both male and female cadets throughout Canada and at Canadian Forces Bases Lahr and Baden-Soellingen, West Germany.

Army cadets of the Governor General's Foot Guard Cadet Corps of Ottawa learning infantry tactics at the Connaught Rifle Range.

(by 2Lt R. Hutchingame)

The cadet training program is conducted at cadet corps/squadron headquarters during the academic year and at DND camps during the summer period. Operated at more than 30 locations across the country, these camps provide training in leadership, physical fitness and environmental specialities such as sailing, seamanship, communications, flying, gliding, mountaineering and parachuting. As well there are various trades training, courses, exchange visits and training cruises in HMC Ships. These activities, attended by over 20,000 cadets during the summer months, are conducted principally by officers of the Cadet Instructors List, with assistance from Regular Force, Primary and Supplementary Reserve personnel, civilian instructors and staff cadets.

MAPPING AND CHARTING

The Mapping and Charting Establishment (MCE) is an independent map production unit of the Canadian Forces. Staffed by 124 military members and 64 civilians the unit provides mapping, charting and survey services.

From July to August 1987 the Mapping and Charting Establishments conducted *Operation Arctic 87* on Ellesmere Island in the Northwest Territories. This operation concluded a 20-year program of producing field survey control for 1:50,000, tactical scale, topographic mapping in Northern Canada. The previous 20-year program had been for 1:250,000, reconnaissance scale, topographic mapping in the North.

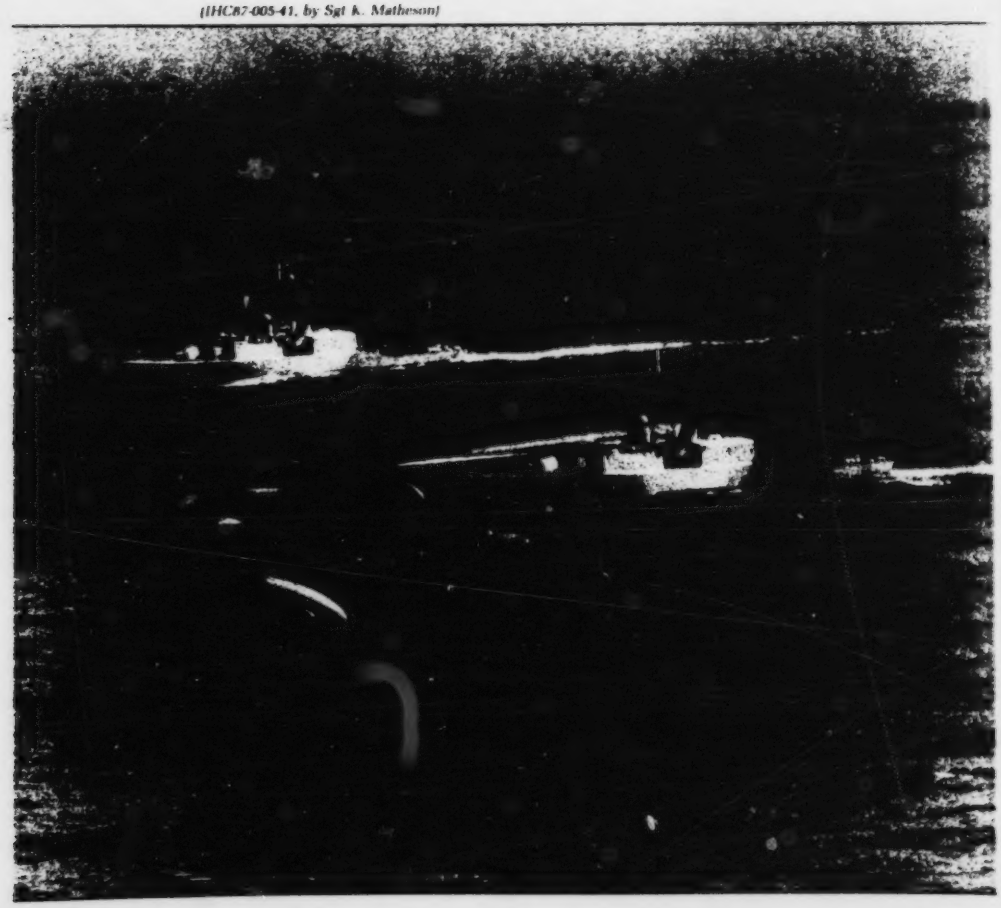
Operation Arctic 87 concluded a four-year survey of Ellesmere Island. In addition to providing technical data in support for both Canadian requirements for topographic mapping and the Canada-U.S. Basic Security Plan for the defence of North America, it continued a military presence in the North in support of sovereign jurisdiction over Canada's remote areas.

At its Ottawa base, MCE completed the first year of production using its newly installed semi-automated equipment systems to collect digital geographic information. Trades and operational readiness training and production continued to meet the Department's requirements for special military geographic support and for products such as Joint Operation Graphics, Military Town Plans, Training Area Maps, Terrain Analysis Products and Topographic Squadron deployments to support *Rendezvous 87*.

MARITIME COMMAND

A Sea King overflies two of Her Majesty's Canadian Ships.

(IHC87-005-41, by Sgt K. Matheson)

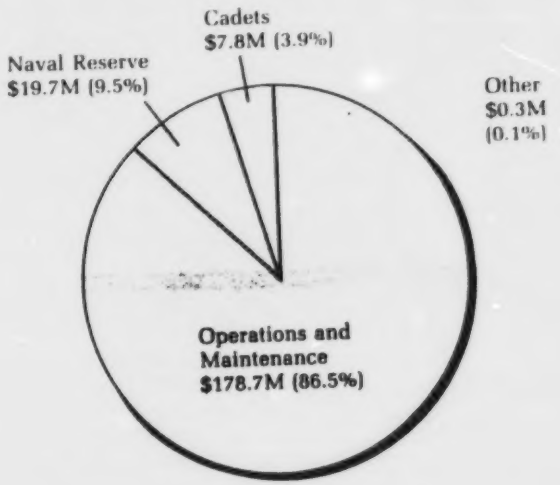


ROLE

The Maritime Command (MARCOM) role is to have a maritime force ready to meet Canada's defence commitments. This role is fulfilled using MARCOM resources and dedicated Air Command aircraft under MARCOM control.

BUDGET

MARCOM's Dollar Usage FY 1986-87 $206.5M



PERSONNEL

Maritime Command

Commander MARCOM	Vice-Admiral C.M. Thomas
Regular Force	9,761
Naval Reserves	3,599
DND Civilian Employees	7,992
Total	21,352

OPERATIONS AND TRAINING

General

The air, surface and sub-surface resources of Maritime Command maintained a high-level of combat-readiness through a balanced schedule of joint exercises, independent operations, tactical research and planned maintenance. MARCOM vessels averaged 100 days at sea. During 1987, Canadian destroyers and fleet replenishment ships participated in major operational exercises including *Ocean Safari*, *Open Gate* and *Operation Vendetta*.

(SWC87-413-2, by MCpl B. Taylor)

HMCS Gatineau entering Halifax harbour to replace HMCS Huron. April 1987.

An exchange of ships was conducted between the East and West Coasts to balance the anti-submarine warfare (ASW) capabilities on each coast. HMCS *Gatineau* arrived in Halifax with anti-submarine rocket (ASROC) torpedoes, while HMCS *Huron* was sent to Esquimalt, B.C. to provide an air operations capable destroyer.

Two Maritime Coordinated Training (MARCOT) Exercises were conducted to maintain combat-readiness and to evaluate new tactics. Destroyer squadrons conducted their own exercises, termed *Squadex*, involving multi-threat scenarios.

Maritime Command participated in defence research projects in Atlantic and Pacific waters and provided support to the oceanographic research vessels Canadian Forces Auxiliary Vessel (CFAV) *Quest* and CFAV *Endeavour*.

Sovereignty and Surveillance Operations

Sovereignty and surveillance responsibilities were met through air, sub-surface and surface patrols, port visits and provision of support to other government departments including Fisheries and Oceans.

Maritime Command ships and Maritime Air Group aircraft maintained military surveillance of Canadian territorial waters and the 320 km-wide Economic Zone. Her Majesty's Canadian Ships *Cormorant*, *Margaree*, *Fraser* and *Gatineau* conducted Canadian Atlantic (CANLANT) patrols in direct support of this tasking. In addition, all Maritime Command and Maritime Air Group units carried out this function as a secondary tasking whenever they operated in Canadian territory.

The summer Great Lakes cruise was conducted by HMCS *Saguenay*, paying visits to seven ports in Ontario and Quebec.

Atlantic Operations and NATO Exercises

Maritime Command continued to meet Canada's North Atlantic Treaty Organization (NATO) commitment of supplying ships to the NATO Standing Naval Force Atlantic (STANAVFORLANT). Her Majesty's Canadian Ships *Assiniboine*, *Algonquin*, *Iroquois* and *Protecteur* served for specific periods in this operational and highly visible multi-national squadron.

On March 27, 1987, Canada assumed command of STANAVFORLANT during a ceremony in Norfolk, Virginia. Commodore L. Mason became the sixth Canadian to command the squadron, replacing Commodore J. Haver Droeze of the Royal Netherlands Navy.

Commodore L. Mason, the Commander of the NATO's Standing Naval Force Atlantic.

(by Cpl M. Bergeron)

(HMCS 0204 by Sgt A. Matheson)

Ships of NATO's Standing Naval Force Atlantic replenish at sea near Portugal.

The past year's schedule included participation in four major exercises including: *Operation Vendetta*; *Open Gate*; *Ocean Safari*; and the *Joint Maritime Course*. As well, STANAVFORLANT conducted its own independent operations and refresher workup operations in the North Atlantic, Norwegian Sea, Greenland-Iceland-United Kingdom gap, North Sea, Eastern Seaboard and the Caribbean Sea. STANAVFORLANT also maintained a high profile in NATO seaports. HMC Ships, serving with STANAVFORLANT, visited 21 ports from Fort Lauderdale, Florida to Fredrickshaven, West Germany.

Pacific Operations

Ships of the Second and Fourth Canadian Destroyer Squadrons participated in two major Canada-U.S. exercises during 1987, *Readiex* and *Sharem*. In addition, Pacific units exercised national anti-submarine warfare operations (both sea and air) on a regular basis in the North Pacific and the Gulf of Alaska.

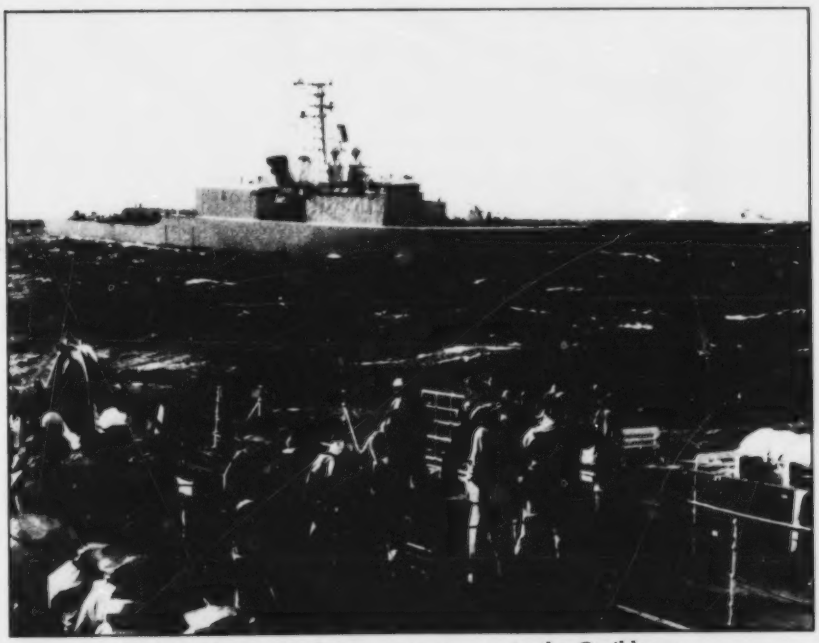
Training

Maritime Command remained heavily committed to training at all levels. Two combat control officer courses culminated in a two-week sea phase Combat Control Officer Dedicated Training

Period, *Combatex*, where students practised all aspects of naval warfare, followed by a tactical exercise, *Tacex*, freeplay period. Destroyers were also tasked to support the Fleet School Anti-Submarine Aircraft Controller courses, Above Water Weapons Director courses, Helicopter Destroyer Deck Landing serials and Destroyer Navigating Officer courses. Submarines provided target services to Maritime Air Group for training and international competitions. Fleet replenishment ships, destroyers and submarines acted as consorts for the ships undergoing workups after completion of refits or at the mid-point of their operational cycles.

During 1987, the Fleet Schools, in both Halifax and Esquimalt, conducted training for more than 14,000 sailors. Emphasis was placed upon the training that arose from the Canadian Towed Array Sonar System (CANTASS) program, the updating and modernization of the *Tribal Class* destroyers and the future introduction of the new patrol frigates.

Training Group Pacific, which is comprised of the Fourth Canadian Destroyer Squadron, the Canadian Training Squadron and the Naval Officer Training Centre *Venture*, continued to fulfil its primary role of conducting basic training for all naval officers,



IHC87-005-34, by Sgt K. Matheson

HMCS Algonquin during manoeuvers in the Caribbean.

both Maritime Surface and Sub-Surface (MARS) and Maritime Engineers (MARE). Students undertook navigation, shiphandling, naval engineering and leadership training in a combination of afloat and ashore phases. More than 400 Regular and 380 Naval Reserve Junior Officers completed at least one phase of training at either *Venture* or the Naval Reserve Training Centre. This was followed by afloat training in one of the nine auxiliary vessels of the Second Training Division, the four patrol boats (ex-minesweepers) of the First Training Division, HMCS *Oriole*, the navy's only sail training vessel or the four *Mackenzie Class* destroyers of the Fourth Canadian Destroyer Squadron. While carrying out naval officer training, all ships and vessels of Training Group Pacific achieved and maintained high-levels of combat-readiness through intensive local training and exercises with the United States Navy. During 1987, 70 MARS and 75 MARE Officers were awarded their certificate of Competency Level One and joined the operational fleet.

REGIONAL OPERATIONS

Atlantic Region Operations

The Commander Maritime Command is also the Commander Atlantic Region, and as such maintains close liaison with and when requested provides assistance to federal, provincial and municipal authorities. During 1987 the Atlantic Region responded to 150 requests for explosive ordnance disposal, processed 65 requests for air displays and conducted 155 mercy flight missions.

Other regional operations included:

- support for the royal visit of His Royal Highness Prince Edward in June;
- the co-ordination of DND support to the Governor General's visit from February 28 to March 4;
- operational control of all DND support for the Nova Scotia Tattoo;
- the co-ordination of assistance to various charity and community activities within the Atlantic Region;
- the provision of services to Prince Edward Island in February during a snowstorm and to New Brunswick for flood fighting in April;
- the provision of services to Nova Scotia and New Brunswick in two missing person searches;

- the co-ordination of DND support to Employment and Immigration Canada for the transportation, housing, feeding and detention of 174 refugees; and
- the conducting of an exercise at several Atlantic institutions to test regional assistance under the Federal Penitentiaries Plan.

(HSC87-0196-10 by Cpl S. McNeil)

The SDL-1 submersible from the Fleet Diving Support ship HMCS Cormorant prepares for a dive.

Regional Operations Reserve

During 1987, Atlantic Region continued its program for the employment of reservists in support of regional operations for peace and war. The Regional Operations Reserve in the four Atlantic provinces has over 70 former Regular Force and Primary Reserve officers on attachment from the Supplementary Reserve to carry out specific training and projects. This program is especially useful since it provides many man-years of experience which is of signficant value in Reserve revitalization.

Atlantic Region Cadets

Atlantic Region supports 230 Cadet Corps and Squadrons with a combined population of 11,932 cadets. An establishment of 1,005 Cadet Instructors' List (CIL) officers and 651 civilian instructors was available to conduct training.

Highlights of 1987 included:

- the attendance of 3,707 cadets at summer training camps within the Atlantic Region, including the awarding of Glider Wings to 57 successful candidates;
- both spring and fall Gliding Familiarization Programs conducted at seven Gliding Centres in the Region. Familiarization flying in light aircraft was carried out in areas that are isolated from established gliding sites;
- the awarding of "Wings" to 45 Air Cadets who undertook power flight training at flying clubs at Greenwood, Waterville, and Shearwater, N.S. and Moncton, N.B.;
- conducting of orienteering competitions for Army Cadets, training for Range Safety Officers, Cold Weather Indoctrination courses, and Canoe and Abseiling Instruction Training for CIL officers throughout the Region;
- Sea Cadet regattas conducted at six locations within the Region, plus the participation in the National Regattas held at HMCS *Quadra* B.C. and Muskoka, Ont.;
- sail training at six sites within the Region;
- the participation of 63 cadets who took part in the International Cadet Exchange Program and 391 cadets who attended Out-of-Region courses;
- the participation of Sea Cadets in major public appearances including cadets of HMCS *Acadia* from CFB Cornwallis, N.S., in the performance of the Naval Sunset Ceremony in Halifax alongside the Memorial Corvette HMCS *Sackville*;
- the participation of cadets in the National Sea Cadet Cruise aboard the topsail schooner *Anne Kristine* which sailed out of a number of Maritime ports. A total of 94 cadets and nine CIL officers boarded the schooner for day-runs while it was visiting various ports; and
- the forming of two new tri-service Cadet Schools of Music — the School of Pipes and Drums co-located with Cadet Camp Argonaut at CFB Gagetown, N.B., and the Atlantic School of Music co-located with HMCS *Acadia* at CFB Cornwallis, N.S.

Canadian Rangers

The Canadian Rangers of the Atlantic Region number 950 all ranks and are divided into 31 platoons located in Labrador, Nfld. and along the north shore of the St. Lawrence River in Quebec. Revitalization of the Canadian Ranger program has led to an increase in personnel and training. Regular training has involved seminars, explosive ordnance disposal lectures, maritime coastal defence and infantry patrol tactics.

Pacific Region Operations

The Commander of Maritime Forces Pacific, Rear Admiral R.E.D. George, is also the Commander of Pacific Region. Regional operations included:

- coordinating DND support to the Commonwealth Heads of Government Meeting held in Vancouver and Kelowna, B.C., in October; and
- coordinating activities associated with the royal visit to British Columbia of Her Majesty the Queen and His Royal Highness Prince Phillip from October 9 to 15, 1987.

NOVA SCOTIA TATTOO 1987

Maritime Command again participated in sponsoring the Nova Scotia Tattoo jointly with the province of Nova Scotia. The Tattoo, which began in 1979, has become a major annual event of international status drawing in excess of 50,000 spectators over six evenings. With the *International Gathering of the Clans* as the theme of 1987, there was an abundance of pipes and drums, including: both battalions of the Nova Scotia Highlanders; the 48th Highlanders of Canada; The Toronto Scottish Regiment from Central Militia Area; and 33 Service Battalion of Halifax.

Other participants included the Canadian Forces School of Music Band from Esquimalt, B.C., the Stadacona Band of Maritime Command, the Atlantic Militia Area Band, the National Band of the Naval Reserve plus two foreign bands — the German Air Force Band, Luftwaffenmusikkorps 3, and the Quantico Band of the United States Marine Corps.

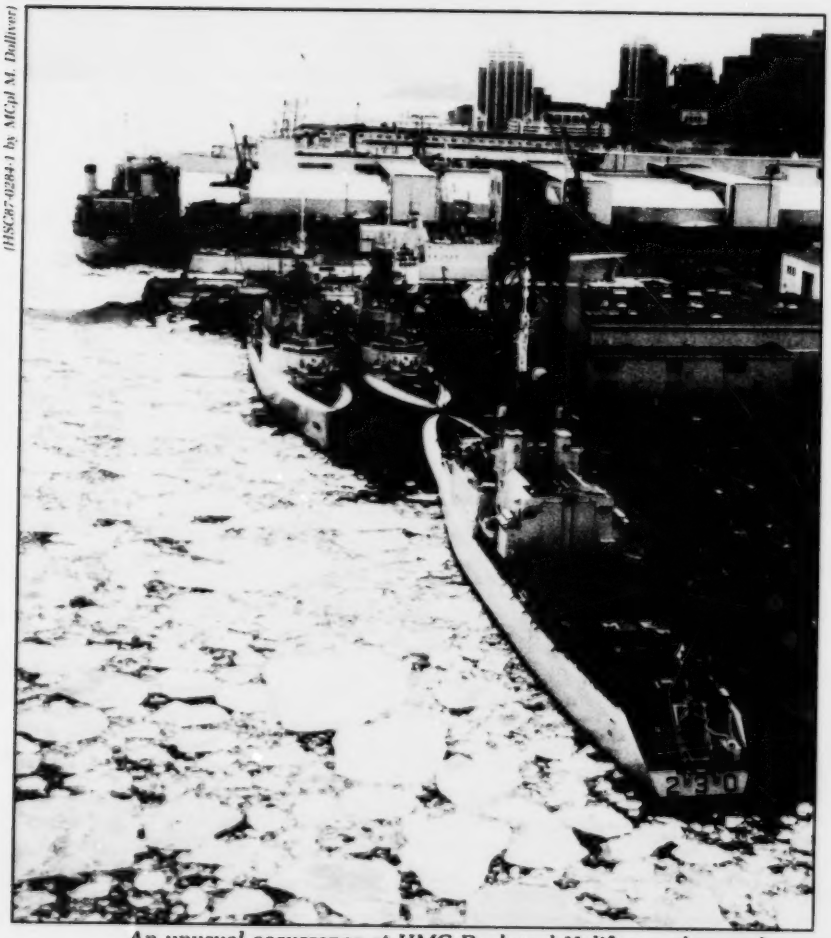
The Canadian Forces Fleet School presented an ingenious ladder display, and the Naval Gun Run Competition between East and West Coasts again thrilled the audiences. A highlight of this year's show was the ceremony of trooping the colour by the 2nd Battalion, The Royal Canadian Regiment and their Regimental Band.

RESERVES

The Naval Reserves

During 1987, a project was initiated to develop a Maritime Coastal Defence Organization (MCDO) which the Naval Reserve was tasked with manning. In the White Paper on defence, Reserves were also tasked with manning two new classes of Minor War Vessels. To meet these commitments, the Naval Reserve is being expanded. The first effects of these changes were felt in

(HSC87-0284-1 by MCpl M. Dolliver)



An unusual occurrence at HMC Dockyard Halifax — abnormal winds and currents combined to clog Halifax harbour with 'brash' ice.

July as Exercise *Summer Express*, formerly a naval control shipping (NCS) training exercise, was expanded to instruct Reserve officers in their new roles. Exercises *Wintex-Cimex*, *Bell Bouy* and *Autumn Leaves* all involved an increase in the number of participants as the new organization evolved.

In May, the Naval Reserve Training ships HMCS *Porte St-Louis* and HMCS *Porte St-Jean* embarked on an extended deployment along the eastern seaboard which took them as far south as Charleston, South Carolina.

Late in the year, two new Naval Reserve Divisions were commissioned: HMCS D'*Iberville* in Rimouski, Que. and HMCS *Radisson* in Trois-Rivieres, Que.

Other Naval Reserves activities for the year included:

- the participation of 2,090 reservists in trade courses or on-the-job training in units across Canada;
- the completion of formal classification or trades training of 870 reservists at both Fleet Schools, at the Naval Reserve Training Centers and at CFB Borden, Ont.;
- leave replacement and incremental staffing of Regular Force positions at various shore facilities;
- the participation in the Nova Scotia Tattoo by the 65-member Naval Reserve Band and by 47 reservists as cast members;
- the training of 1,000 young Canadians in the Summer Youth Employment Program at 21 Naval Reserve Divisions; and
- the employment of over 70 experienced former Regular Force and Reserve personnel by Atlantic Region Headquarters in support of Regional Operations.

CONSTRUCTION AND PROPERTY

On the East Coast, extensive upgrading of Jetty NH was conducted in HMC Dockyard along with the completion and commissioning of the new Dockyard Fire Hall.

Other activities included:

- the start of work on the Otto Fuel Facility at the Canadian Forces Ammunition Depot Bedford, N.S.;
- the construction of a combined mess at CFB Moncton, N.B.;
- the construction of new classroom facilities at CFS Shelburne, N.S.; and
- the upgrading of the electrical distribution system at CFB Halifax, N.S.

CFB Esquimalt

CFB Esquimalt, B.C. conducted major renovations on the Naval Reserve Training Centre and Boatswain Division buildings. Within dockyard, two jetties underwent upgrading and a third jetty was dredged. At Patricia Bay, hangar facilities and tarmac were upgraded in preparation for the arrival of the *Sea King* helicopter detachments.

MOBILE COMMAND

Soldiers in Canada's Arctic during Lightning Strike 87.

(ISC87-070-22, by Sgt J. Blovin)

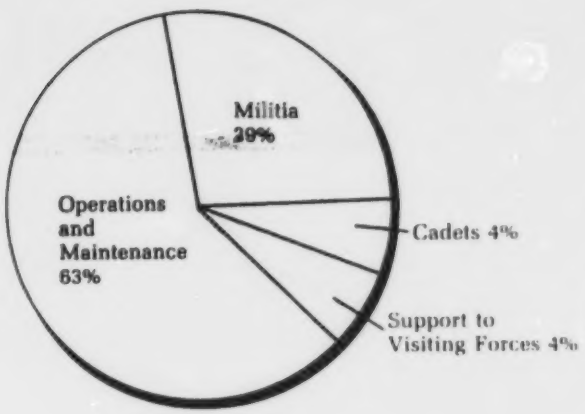
ROLE

Mobile Command (FMC) maintains the combat-ready land forces necessary for Canada to meet its defence commitments.

BUDGET AND PERSONNEL

In 1987 Mobile Command consisted of 39,938 Regular Force members, Primary Reserve members and civilian employees who served under the command of Lieutenant-General J.A. Fox, Commander of Mobile Command and Eastern Region.

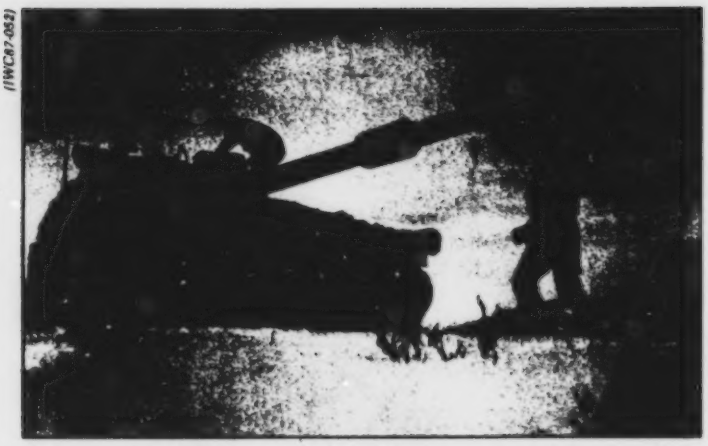
FMC Budget $285 million



OPERATIONS

Members of Mobile Command participated individually and collectively in numerous international and domestic operations. Domestic operations included provision of personnel and equipment to aid civil authorities in Search and Rescue missions and provision of security forces and logistical support for international conferences. International operations consisted of personnel support to United Nations peacekeeping forces in Cyprus and the Middle East. The largest Canadian representation was again, as it has been since 1964, in Cyprus. This semi-annual rotation of over 500 members is termed *Operation Snow Goose*. This year the 2nd Battalion, Royal 22e Régiment (2R22eR) replaced the Canadian Airborne Regiment in March, while the 5e Régiment d'artillerie légère du Canada (5 RALC) relieved 2R22eR in September.

(IWC87-053)



Gunners of 3 RCHA prepare their M109 A3 155mm Howitzer for a live firing practise near CFB Shilo, Man.

TRAINING

Throughout 1987, individual battle skills were practised, refined and verified through an intensive program of collective training. The training highlight was Exercise *Rendezvous 87 (RV 87)*; the most recent in a series of biennial field deployments of an army Task Force.

Rendezvous 87 — This exercise, conducted at CFBs Wainwright and Suffield, Alta. grouped over 11,000 troops from Mobile Command, Communications Command, 10 Tactical Air Group and Fighter Group, as well as significant personnel support from the United States Army and Air Force. Regular Force and Militia personnel, working together, demonstrated that the Total Force is functioning effectively in the army.

Formation Training — The three major formations of Mobile Command practised their winter warfare skills prior to *Rendezvous 87*, each displaying its special character and diversity of tasks. 5e Groupe Brigade du Canada (5e GBC) conducted Exercise *Nez-Rouge* in the Matapedia Valley of Quebec, with participation by elements of the United States Marine Corps, a light infantry company of the French 13e Bataillon de Chasseurs and a platoon from the Norwegian Army. 1 Canadian Brigade Group (1 CBG), whose units are dispersed from Victoria to Winnipeg conducted Exercise *Rapier Thrust* in a manner well suited to its dispersion; all major units deployed for winter training from their respective garrison locations to local training areas. The Special Service Force, based in Petawawa, Ont. which is heavily committed to Defence of Canada Operations (DCO) in the North,

conducted Exercise *Lightning Strike 87* in the Frobisher Bay area. This was the first force-level (brigade) exercise conducted north of 60 degrees latitude.

Unit and Sub-Unit Training — Since great emphasis is placed on exercising in the North, four Arctic exercises involving company-sized groups and one comprising a force of battalion strength were conducted between March and December.

International Training, Exchanges and Competitions — Mobile Command's preparedness to move combat-ready troops on short notice to serve with multi-national forces has had the effect of projecting a dynamic Canadian presence internationally. This is best demonstrated by Mobile Command's increasing degree

(RVC87-0344, by Pte R. Macleod)

The crew commander of a Grizzly wheeled armoured personnel carrier gives orders to his driver during Rendezvous 87.

of participation in foreign exchanges, training and competitions. Among the most noteworthy of these activities in 1987 were:

- the expansion of the Small Unit Exchange Program to include Canada, the United States, Norway and Jamaica. Canadian soldiers trained in a variety of environments ranging from the high Arctic to the jungle;
- the training of members of the Special Service Force with their counterparts in France and the United Kingdom while French and British troops received winter warfare training in Canada;
- the sub-unit exchanges conducted between 5e GBC and Norway, France and Bermuda;
- the participation of the 1st Battalion, The Royal Canadian Regiment (1 RCR) in Exercise *Accord Express 87* in Denmark; and
- the competing of an infantry section from the 3rd Battalion, Royal 22e Régiment (3R22eR) in the Northern European Command Infantry Competition in Denmark.

Augmentation for Canadian Forces Europe — Once again, more than 250 Regular and Reserve Force members of Mobile Command augmented 4 Canadian Mechanized Brigade Group (4 CMBG) in Germany for the annual series of autumn exercises.

Individual Training — Mobile Command comprises several training establishments in addition to its Field Force and bases. These establishments include the Combat Training Centre in

(IWC87-093)

The air defence battery of the 3rd Regiment, Royal Canadian Horse Artillery conducting a live-fire practise using a 40mm Boffin.

Gagetown, N.B.; the Airborne Centre in Edmonton; and Regimental Battle Schools in Wainwright, Alta.; Shilo, Man.; Petawawa, Ont., and Valcartier, Que. During 1987, combat arms basic trades training and junior leadership courses were conducted at the battle schools, basic and advanced parachute training were conducted at the Airborne Centre, while advanced trades training and officer classification training continued at the Combat Training Centre. Additionally, Mobile Command sent candidates on more than 40 courses with Allied forces and at civilian institutions throughout the world.

Training Development — The Command Training Development Centre at the Combat Training Centre provides training development services to Mobile Command. Throughout 1987 the Command Training Development Centre continued to develop and implement numerous projects, analyze training problems, define training requirements, design training programs and validate courses. The validation process was automated and upgraded, enabling the Centre to double its production output.

THE MILITIA

Role

As the Primary Reserve component of Mobile Command, the Militia enhances the war deterrence capability of the Canadian Forces and supports ongoing peacetime tasks and activities.

Collective Training

The Militia consists of some 16,000 funded positions distributed amongst major and minor units throughout the country. Collective training takes place during District and Area concentrations, and Reserve personnel regularly participate in Regular Force training exercises. Approximately 700 Militia personnel participated in *Rendezvous 87*, and some 6,300 attended Area concentrations in 1987.

Individual Training

The training of Militia members is based on the Militia Individual Training and Career Profiles (MITCP), which are being related more closely to mobilization requirements. In 1987 the requirement for Militia officers to complete Force Mobile Command Officer Examinations (FOE) for career progression was formalized, demonstrating the increasing degree to which Reserve training standards are mirroring those of the Regular Force. Individual training is conducted by Militia units at Area Rank and Trade Schools, at National Rank Qualifying Schools, by elements of the Canadian Forces Training System, by the Combat Training Centre and at the Canadian Airborne Centre.

A master corporal of the Essex and Kent Scottish Regiment attempting to save his communicator during a river crossing exercise.

(Courtesy of The Reservist)

The Lorne Scots during rifle practise. *(Courtesy of The Reservist)*

In 1987 some 1,820 Militia personnel attended individual training courses conducted beyond the confines of their units.

Ceremonial Guard

As in previous years, the Militia mounted the Ceremonial Guard during the summer months at the residence of the Governor General and on Parliament Hill. The Ceremonial Guard is composed of one company from each of the Governor General's two household infantry regiments and is accompanied by its 90-piece

band which is recruited nationally. The Ceremonial Guard performs at numerous functions and concerts in the National Capital Region each summer.

United Nations Service

Two groups of 20 Militia soldiers participated in UN peacekeeping operations in Cyprus during 1987.

EQUIPMENT

Mobile Command received the following equipment in 1987:

- **ILTIS Canadian Light Utility Vehicles** — General delivery of the half-tonne vehicles began in March 1986 to replace the Command's aging fleet of M38 A1 Cdn 2 and M151 A2 *Jeeps*. Delivery of the basic vehicle with its seven variants and special equipment vehicle kits, was completed by the end of 1987.

(by Capt. L.W. Calvert, courtesy of The Reservist)

A British Columbia Regiment trooper at the wheel of a newly-acquired Iltis during spring training at Yakima, Washington.

- **Crane Heavy — 60-Tonne** — A total of four cranes were procured and delivered in 1987 to replace the 25-ton cable operated link belt cranes. These new hydraulic cranes will provide the necessary heavy lift requirements for the Engineers.
- **Semi-Trailer Low Bed 35-Tonne Variable Deck Height** — A prototype was procured and trialed in 1986-87. On completion of a successful trial three more were procured and delivered this year.

- **Dozer D6D Armoured Cab** — Procured in 1987 these armoured dozers are replacements for the HD11 operational dozers. Delivery of the two variants and special attachments was made late in 1987. A total of 16 new dozers was acquired.
- **Semi-Trailer Dump, 30-Ton, 20 Cubic Yards** — This new equipment was procured and delivered in 1987. In all, four trailers were distributed, one trailer to each engineer unit at Chilliwack, B.C., Gagetown, N.B., Petawawa, Ont., and Valcartier, Que.
- **Spreader Loose Material** — Four spreaders were procured and delivered in 1987, one to each engineer unit in Canada.

New small arms for the Canadian Forces — the C-7 rifle is the replacement for the FN C1, the standard infantry weapon while the FN Minimi C-9 machine gun will replace the General Purpose Machine Gun.

(IOC 87-16-19, by Sgt M. Reid)

- **Small Arms Replacement Project** — The delivery of the new small arms weapons began this year. The project is to be completed by the early 1990s.
- **MT 500 Motorcycles** — Several of these motorcycles were issued to units 1 CBG and 5e GBC. Units of the Special Service Force will receive an initial issue once operator and maintenance training has been completed.
- **Medium Logistics Vehicle Wheeled (MLVW)** — The delivery of *MLVWs* to all Mobile Command units was completed in 1987.
- **C6 Machine-Gun** — These machine guns are designed for employment in the ground-mounted role in both the Regular Force and the Militia. Deliveries to units continued throughout the year in accordance with the procurement schedule.
- **Signals Equipment** — 5e GBC received the field development system (FDS) as a forerunner for field automation of command, control, communications and intelligence. Each brigade group

The C-8 carbine features a folding buttstock. This weapon will be used primarily by crews of armoured vehicles.

(IOC 87-16-11, by Sgt M. Reid)

also received Morse code training equipment to facilitate faster and more accurate training of radio operators in basic communications skills.

- **TOW Night Sight (TNS)** — 82 *TOW* Night Sights were delivered in 1987. The sight is a thermal imagery device which detects targets at night and in conditions of limited visibility. The device is mounted on the *TOW* (Tube-launched, Optically-tracked, Wire-guided) Heavy Anti-tank Missile Launcher.

ENGINEERS

Role

The Command Engineer Branch and the Base Engineers were directly responsible for carrying out approximately $63 million of contruction and maintenance in support of Mobile Command bases. Much of this was done with DND civilian and military

resources, although a good deal was also carried out by civilian contract and Defence Construction Canada. The Command Engineer, as the principal advisor to the Commander Mobile Command on all field and facilities engineering matters, coordinates all military engineering services provided to the formations and bases within Mobile Command.

Rendezvous 87

During *Rendezvous 87*, 1 and 2 Combat Engineer Regiment and 22 Field Squadron combined under the Commander Divisional Engineers (CDE) to form an Engineer Group directly responsible to the Divisional Commander. At the same time, the Camp Engineer for Camp Wainwright provided facilities engineering support to the deployed FMC Division.

As part of this centralized coordination, Base Engineers continued to provide resources in garrison directly in support of the Combat Engineer Regiments and 22 Field Squadron to overcome a backlog of equipment maintenance. They also contributed military engineer tradesmen to form a construction troop at Camp Wainwright as part of the Engineer Group at *Rendezvous 87*, and built a $250,000 Recreation Building for the Camp.

An officer of 2 CER awaits a reply before carrying on with the next phase of his mission.

(RVB87-307, by Sgt D. Mah)

AIR COMMAND

The CF-18 completed five years of service in the Canadian Forces this year.

(ICS87-514A by WO V. Johnson)

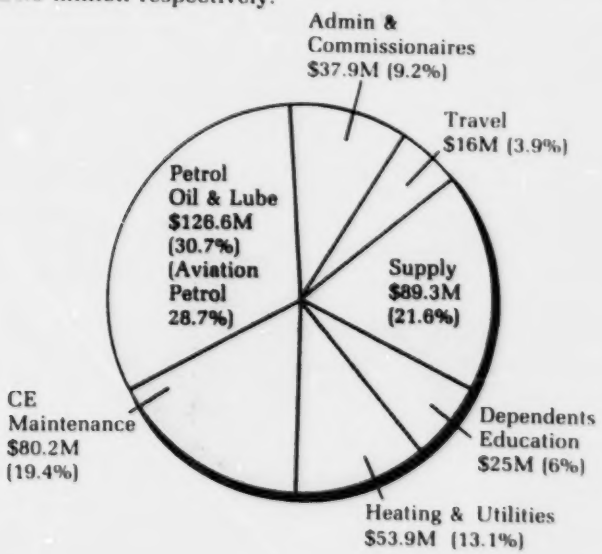
ROLE

Air Command, is the largest of the Canadian Forces commands and is headquartered at Canadian Forces Base Winnipeg. During 1987, it was commanded by Lieutenant-General Larry A. Ashley. Air Command's six functional groups provide combat-ready air forces to meet Canada's defence commitments. It is also responsible for the Prairie Region.

PERSONNEL AND BUDGET

Air Command consists of 23,656 Regular Force members, 950 Air Reserve members, and 8,500 civilians for a total of 33,106 people. The operations and maintenance budget for 1987-88 was $427 million. The budget for the Air Reserves; the Prairie Region Cadets; and Allied Military Training at Canadian Forces Station Goose Bay, Nfld. was $6.6 million, $6.5 million and $24.8 million respectively.

Air Command Expenditures FY 1986-87


Admin & Commissionaires $37.9M (9.2%)
Travel $16M (3.9%)
Petrol Oil & Lube $126.6M (30.7%) (Aviation Petrol 28.7%)
Supply $89.3M (21.6%)
CE Maintenance $80.2M (19.4%)
Dependents Education $25M (6%)
Heating & Utilities $53.9M (13.1%)

PROJECTS AND PLANS

Goose Bay Development

On February 13, 1987, the Royal Netherlands Air Force joined the Royal Air Force, the German Air Force, the United States Air Force and the Canadian Armed Forces in a multinational Memorandum of Understanding to cost-share common-user items at Goose Bay, Nfld. Negotiations continued with Transport Canada regarding the transfer of management and control

of the Goose Bay airport to the Department of National Defence. Goose Bay remained as one of the two possible sites for the NATO Fighter Weapons Training Centre.

Air Command Tactical Air Control System (TACS)

Development of up-to-date Battlefield Airspace Management doctrine continued, driven by advances in technology on the modern battlefield. In that light, a Statement of Requirement for an air transportable tactical air control system was sent to NDHQ for further study and action.

North American Air Defence Modernization (NAADM)

Implementation of the first phase of the North Warning System began this year. Five long-range radars were installed and have been integrated into the Canada West area of responsibility. Staffing action has commenced on the project definition phase of the Forward Operating Locations (FOLs) for NORAD aircraft. FOLs will allow these aircraft to intercept and identify unknown aircraft in Canada's Arctic and will also support Canada's CF-18 sovereignty missions. All phases of the North American Air Defence Modernization program are scheduled to be completed by the early 1990's.

(NBC87-0441-7 by Cpl Cannons)

Mr. Perrin Beatty during the first official test of the North Warning System at CFB North Bay, Ont.

Aircraft Acquisition

The master implementation plan (MIP) for introduction of the De Havilland CT-142 *Dash-8* Air Navigation Trainer was put forward. The plan identifies four CT-142 aircraft to replace four CC-130 *Hercules* used in the training role. It will allow the *Hercules* to be used by Air Transport Group for transport duties.

An EF-101 VooDoo from 414 Electronic Warfare Squadron, CFB North Bay, Ont. banks over a frozen lake near North Bay.

Deliveries of the CF-18 continued on schedule in 1987 and by the end of the year 121 had been received. Four CC-144 *Challenger* aircraft entered service with 414 Electronic Warfare Squadron at Canadian Forces Base North Bay, Ont. The aircraft are replacements for the EF-101 *Voodoo* and the EC-117 *Falcon* which were the mainstay of the Canadian Forces electronic countermeasures training assets.

Canadian Forces School of Aerospace Studies (CFSAS)

This new school was opened on July 6, 1987, in Winnipeg and incorporates all advanced air related training for Air Command that is not restricted to a single classification. Approximately 600 students per year will be trained on courses such as the aerospace systems course, the space indoctrination course, electronic warfare courses and the basic air staff operations course. Eventually, the CF School of Aerospace Studies will expand to conduct advanced air staff and senior officer training in aerospace related fields.

FIGHTER GROUP

The CF-18 implementation program continued with emphasis on the conversion training of operational and support personnel. Operational pilot training courses were conducted by 410 Tactical Fighter (Operational Training) Squadron. Graduating pilots supplemented 409, 439, 425 and 421 Tactical Fighter Squadrons and contributed to the reactivating of 441 and 433 Tactical Fighter Squadrons. Extensive CF-18 conversion training for technical trades personnel was continued by 10 Field Technical Training Unit at CFB Cold Lake, Alta.

Since November, a permanent detachment of CFB Cold Lake's 441 Tactical Fighter Squadron has held North American Aerospace Defence Command (NORAD) alert posture at CFB Comox, B.C. In December, 433 Tactical Fighter Squadron of CFB Bagotville, Que., began intensive combat-ready training to become a rapid reactor squadron for Central Europe augmentation.

During the year, Fighter Group provided extended air defence in the North by participating in NORAD exercises from Iqaluit and Inuvik, N.W.T. In June, 425 Squadron overflew the North Pole in conjunction with Exercise *Amalgam Chief 87/2*. On four separate occasions CF-18s operated from Inuvik. During Exercise *Amalgam Chief 88/1*, four CF-18s deployed to Inuvik to hold NORAD alert in mid-December while the other deployments supported North Warning System testing. Fighter Group forces also participated in large-scale warfare exercises such as *Maple Flag* at CFB Cold Lake and Mobile Command's *Rendezvous 87* at Wainwright, Alta. CF-5 aircraft from 434 Tactical Fighter Squadron were Canada's primary jet fighter contribution to the *Rendezvous* exercise. This squadron also conducted the final tactical aircraft deployment to Andoya, Norway. For the first time 419 Operational Training Fighter Squadron deployed from CFB Cold Lake to Europe to exercise their trans-Atlantic procedures and become familiar with European operations.

Fighter resources were called upon to support NORAD, Maritime Command and Mobile Command exercises from Alaska to

the Caribbean and relied on the support of Air Transport Group CC-137 *Boeing 707* air-to-air refuelling tankers. For northern operations and overseas deployments the CC-130 *Hercules* transport aircraft was essential to the successful completion of these exercises.

CF-18 aircraft from 410 and 441 Tactical Fighter Squadrons participated in a live air-to-air weapons evaluation exercise called *Combat Archer* held at Tyndall Air Force Base, Florida. The aim was to evaluate the CF-18 weapons systems and to provide pilots with air-to-air missile firing experience. 410 Squadron practised air-to-air detection and tracking of the Air Launched Missiles in tests north of CFB Cold Lake. Both CF-5 and CF-18 Squadrons participated in numerous dissimilar air combat training exercises organized with fighter squadrons of the United States.

(CKC87-6929 by MCpl W. Beaudoin)

CF-18 fighter pilots participated in Combat Archer in early December. This live-fire exercise was conducted at Tyndall Air Force Base, Florida.

425 Squadron aircraft routinely deployed to the East Coast to intercept and identify Soviet *Bear* aircraft that approached the Canadian coastline.

Fighter aircraft thrilled audiences across Canada and in selected locations in the United States with their agility and power during local and international airshows.

Fighter Group continued to conduct space surveillance during the year through the Satellite Identification and Tracking Unit at St. Margarets, N.B. Using a Baker-Nunn camera, unit personnel photographed portions of the sky so that the satellites could be pinpointed. The unit also operated the Space Object Identification System to record photometric measurements of light reflected from satellites. The information was fed into

NATO's worldwide Space Detection and Tracking System which maintains precise orbital data and identifies all man-made space objects.

MARITIME AIR GROUP

Commander MAG	Brigadier-General C.M. Curleigh
Regular Force	5,040
Reserves	15
DND Civilian Employees	1,481
Total	6,536

Fixed-wing Operations

Sorties flown by Maritime Air Group's fixed-wing aircraft during 1987 included anti-submarine warfare surveillance, fleet utility support operations, northern sovereignty patrols, fisheries operations, pollution monitoring flights and coastal surveillance missions. Some of these sorties were in support of the Department of Employment and Immigration (DEI). In the anti-submarine warfare role, CP-140 *Aurora* aircraft conducted surveillance of the deployed Soviet submarine fleet and maintained other surveillance activities alone or in conjunction with multinational forces while operating from various bases throughout Canada, as well as from Pacific and Atlantic Allied locations.

To fulfil NATO and Canada-U.S. agreements, and to obtain operational training, CP-140 *Aurora* aircraft and crews on the East Coast also participated in exercises *Open Gate*, *MARCOT 87/1*, the *Joint Maritime Course (JMC) 87/1, 87/2* and *87/3*, and *Ocean Safari*. Similar exercises on the West Coast included *Rimpac*, *Readiex 87/2* and *Computex*. The Canadian O'Brien Anti-Submarine Warfare Competition winners, 415 Maritime Patrol Squadron, also participated in the Commonwealth Fincastle Anti-Submarine Warfare Competition held in Canada.

CP-121 *Tracker* aircraft carried out the bulk of surveillance and identification missions in support of the Department of Fisheries and Oceans on both the Atlantic and Pacific coasts. They were also involved in *MARCOT 1/87* and *2/87*, and *Combatex 1/87* and *2/87*. A Tracker detachment conducted Search and Rescue as well as fisheries support operations from St. John's, Nfld.

CT-133 *Silver Star* aircraft operations supported gunnery exercises *MARCOT*, *Gunnery* and *Combatex*. A radar threat emitter installation program was initiated for the CT-133. This system simulates missile profiles and provides training in missile detection/avoidance techniques for ships personnel. Northern patrols for fisheries surveillance, ice reconnaissance, pollution control and wildlife protection were conducted by *Auroras* and *Trackers*. Both aircraft continued to go through a

depot level inspection and repair program. Additionally, an omnibus modification program for the *Aurora* was completed in the first half of 1987, resulting in improved aircraft performance. One aircraft was lent to industry for the development of a turbo-engined version. Air Command celebrated 30 years of operational service of the *Tracker* in the Canadian Forces.

A CP-121 Tracker from CFB Summerside, P.E.I., overflies a Canadian Coast Guard vessel during a routine patrol off the East Coast.

Rotary-wing Operations

CH-124A *Sea King* helicopter squadrons and the Air Maintenance Section at CFB Shearwater, N.S., provided operational helicopter air detachments (Helairdets) to Maritime Command's ships. Four of the Maritime Air Group *Sea King* helicopters were sent to the West Coast as phase one in the establishment of a permanent anti-submarine warfare helicopter squadron in the Maritime Forces Pacific (MARPAC) Region. These helicopters, based in Patricia Bay on Vancouver Island, are forming Helairdets for HMCS *Provider* and HMCS *Huron*. The *Sea Kings*, as part of the ships' anti-submarine warfare weapons systems, are embarked when either the Atlantic or Pacific fleet deploys. During the year, helicopters from 443 and 423 Helicopter Anti-submarine Squadrons participated in national and international

A Sea King helicopter preparing to land onboard HMCS Algonquin.

IHC87-005-471

exercises in the Atlantic, the Pacific and the Caribbean. This year for the first time a CH-135 *Twin Huey* helicopter from Utility Squadron 32 deployed for exercise *Caribops* with ships of Maritime Command and provided utility service to the fleet throughout the deployment.

Deployments for 1987 included exercises *Caribops*, *Open Gate*, *Ocean Safari*, *MARCOT 1/87* and *2/87*, *Combatex 1/87* and *2/87*, *Canfltops 1/87* and *2/87*, *ASWOPS 4/87* and NATO Standing Naval Force Atlantic deployments. Atlantic and Pacific port visits, a Great Lakes cruise and a cruise with the Lieutenant-Governor of Newfoundland were also conducted. The helicopter fleet continued to undergo the major depot-level inspection and repair program that started in 1985.

Maritime Air Group Evaluations and Requirements projects for 1987 ranged from software and hardware installations, and new shipborne aircraft (NSA) equipment studies to an improved cargo sling for the *Sea King*. A number of joint Maritime Command/Air Command projects were also completed during the year highlighting the close working relationship between the commands.

10 TACTICAL AIR GROUP (TAG)

The major training commitment of 10 Tactical Air Group during 1987 was to provide tactical aviation support to Mobile Command forces participating in *Rendezvous 87*. As in past *Rendezvous* exercises, 10 TAG units were regrouped into doctrinal squadrons and formed a wing. All facets of tactical aviation support were exercised.

Canada's continuing peacekeeping commitment to the Multinational Force and Observers (MFO) in the Sinai involved 129 members of 403, 427 and 430 Squadrons during the 1987 rotations. The members formed the core of the Rotary Wing Aviation Unit which consisted of nine CH-135 *Twin Huey* helicopters.

CH-147 *Chinooks* continued to provide heavy lift support to *Maple Flag* exercises and to operations in the Arctic. Both 447 and 450 Squadrons participated in the final year of 10 TAG support to the Mapping and Charting Establishment (MCE). For the past eight years *Chinooks* have been instrumental in setting up fuel caches throughout the Arctic islands, which have allowed CH-135 *Twin Huey* helicopters from 403, 408, 427 and 430 Squadrons to transport cartographers to these remote and otherwise inaccessible areas.

Many VIPs were carried by 10 TAG helicopters in 1987, including: Prime Minister Brian Mulroney; His Royal Highness Prince Philip; the Duke and Duchess of York; and the French President, Francois Mitterrand. VIP transport was also required in October for many dignitaries attending the Commonwealth Conference in Vancouver.

The Total Force concept instituted in 1986 led to the reorganization of 1 and 2 Air Reserve Wings into 1 and 2 Tactical Aviation Wings (TAWs) in 1987. The Air Reserve Squadrons were also redesignated as 400 Helicopter Operational Training Squadron (HOTS), 411 Tactical Helicopter Squadron (THS) and 2 Tactical Aviation Helicopter Squadron. The Total Force concept also led to the integration of former Regular Support Unit (RSU) personnel into the Tactical Division Wing organization.

403 Helicopter Operational Training Squadron continued to train *Kiowa* and *Twin Huey* aircrew to operational standards at CFB Gagetown, N.B. The Air Ground Operations School (AGOS) conducted an Advance Aviation Course and several Forward Air Controller (FAC) courses. As well, the Tactical Flight provided aviation support to army basic and advanced courses at the Combat Training Centre (CTC), Gagetown. During 1987, the Operational Training Unit (OTU) for *Chinook* aircrew was transferred from 450 Squadron in Ottawa to 447 Squadron in Edmon-

ton. 3 Field Technical Training Unit (3 FTTU) at CFB Bagotville, Que., provided ground training instruction for *Chinook* maintenance test pilot courses as well as technical training for all maintenance personnel who were being posted to 10 TAG squadrons.

An important task for all 10 TAG squadrons is emergency relief and both 408 and 447 Squadrons became involved in the natural disasters which hit Alberta in August. After the passage of the Edmonton tornado 408 Squadron was tasked to assist by flying Emergency Measures Organization and police officials over the damaged area. When the Grand Prairie area was hit by severe flooding, 447 Squadron evacuated people from threatened areas and transported injured to hospitals. Other 10 TAG operations in 1987 included numerous air displays, fire fighting operations and movement of heavy loads.

AIR TRANSPORT GROUP

During 1987 Air Transport Group maintained the airlift and the Search and Rescue capabilities of the Canadian Forces. In addition to scheduled domestic and overseas flights, executive flights, global training flights and flights in support of other government departments, the Air Transport Group also participated in the following joint strategic and tactical exercises with forces from Australia, New Zealand and NATO countries.

- **Bullseye 87** — a joint Canadian, Australian, New Zealand tactical exercise that was held in Richmond, Australia. Canada was represented by a combined team from 435 and 436 Transport Squadrons.
- **Maple Flag** — a joint Canadian, American and British air combat exercise was held at CFB Cold Lake.
- **Red Flag** — an air combat exercise similar to *Maple Flag* that was held at Nellis Air Force Base (AFB), Nevada.
- **TALEX** — tactical airlift exercises involving 435 and 436 Transport Squadrons were held six times during the year at Canadian Forces bases Trenton, and Edmonton.
- **Snow Goose** — the biannual rotation airlift in March and September of the Canadian contingent United Nations Forces in Cyprus.
- **Boxtop** — an airlift held three times a year to re-supply Canadian Forces Station (CFS) Alert on the northern tip of Elles-

mere Island. Air Transport Group completed 300 flights airlifting 4.3 million litres of fuel and oil and 600 tonnes of cargo during 1987.

- **SAREX** — a Search and Rescue competition involving Canadian and American Search and Rescue units was held at CFB Summerside, P.E.I. Canadian teams placed first in the medical competition and sixth overall.
- **Fallex 87** — the annual augmentation of 4 Canadian Mechanized Brigade Group in Lahr with personnel from Ontario, Manitoba and Nova Scotia.
- **Operation Hurricane** — the airlift of Communication Command personnel to support CFS Alert, N.W.T.
- **Operation Arctic** — the aerial mapping and charting of the high Arctic. Air Transport Group airlifted Mapping and Charting Establishment personnel, equipment and supplies to the Arctic for this annual operation.
- **Volant Rodeo** — an allied tactical competition held annually at Pope Air Force Base, North Carolina. The competition involved aircrew, mobile air movements, maintenance, combat control and security police teams from Canada, the United States, the United Kingdom, Australia, Brazil, Italy, New Zealand, Saudi Arabia and West Germany.
- **Air Refuelling** — as well as normal air-to-air refuelling exercises, CC-137 *Boeing 707* tankers participated in the deployment to Europe of 419 Tactical Fighter Squadron CF-5s during Exercise *Rhine Moose* and 434 Tactical Fighter Squadron CF-5s during *Mallard Safari*. Tankers also participated with CF-18s in the NORAD exercise *Amalgam Chief* in Iqaluit and in a North Pole sovereignty mission.
- **Crosscheck 87** — a tactical airlift exchange exercise with the Royal Air Force was held at RAF Station Lynehan, U.K. with the CC-130 *Hercules* aircraft.
- **Alloy Express** — a mini-*Express* exercise to transport Canadian Forces personnel and equipment to Vaerlose, Denmark was conducted.
- **Rendezvous 87** — the major training activity of the year for Mobile Command in which Air Transport Group transported 11,668 passengers and nearly 200,000 kilograms of freight from across the country to CFB Suffield, Alta. and Camp Wainwright, Alta.

(RVC87-0122, by Cpl M. Labrie)

A telecommunications technician calibrates a radio-sonde antenna during Rendezvous 87.

14 TRAINING GROUP

During 1987, 14 Training Group trained more than 4,300 students and administered the course loading function for over 8,000 Air Command personnel inside and outside the command. Students from Jamaica also underwent training at CFB Portage la Prairie, Man.

The *Snowbirds* completed their 17th flying season in the CT-114 *Tutor* aircraft and it is estimated that more than three million spectators enjoyed their performances at 58 locations across Canada and the United States.

Other notable highlights in 1987 included:

- the formation of the Canadian Forces School of Aerospace Studies (CFSAS) at CFB Winnipeg on July 1. The role of CFSAS is to conduct training in air operations in accordance with approved doctrine and standards; and

- redesignation of the Canadian Forces Aerospace and Navigation School to the Canadian Forces Air Navigation School (CFANS). The role of CFANS is to conduct individual training in air navigation in accordance with approved doctrine and standards.

CADETS

The commander, Air Command was also responsible for the training of approximately 1,565 sea cadets, 2,595 army cadets and 5,238 air cadets in the Prairie Region and Northwestern Ontario. The program included local and community programs with training and administration provided by 695 officers of the Cadet Instructor List with the assistance of civilian instructors.

More than 580 sea cadets trained at the sea cadet establishments at HMCS *Quadra* in Comox, B.C. and HMCS *Gimli* on Lake Winnipeg, Hnausa, Man. Other sea cadets were trained on the West Coast in HMC ships. The 1987 National Sea Cadet Regatta was hosted by HMCS *Quadra* with 25 teams from across Canada. The winning team was from 62 Royal Canadain Sea Cadet Corps (RCSCC) *Niobe* from the Atlantic Region.

The Cadet Leadership and Challenge Course at Banff, Alta., graduated 161 Canadian army cadets in 1987. The course was also completed by 7 German youths, 12 British army cadets.

During the winter months biathlon training continued throughout the region and army cadets attended special nordic ski courses at the Outward Bound School, Keremeous, B.C. Three Manitoba cadets participated in the National Biathlon championships in Camrose, Alta., and performed impressively within their age groups.

Air cadets in the region participated in a variety of summer training courses at Cold Lake, Penhold, and Camp Wainwright Alta.; Saskatchewan Cadet Camp, Sask.; and Gimli, Man. Flying schools were also held across the region and spring and fall gliding programs continued. The Prairie Region Cadet School of Music was established during the year at CFB Penhold and a summer training course of music instruction was offered to 120 army and air cadets.

AIR RESERVE GROUP

Air Reserve Group continued its normal training during nights, weekends and on courses run during the summer. Air Reserve Group units received valuable training and experience through exercises.

The units of Toronto and Montreal areas were primary participants in *Rendezvous 87*. Various other exercises provided

experience more specific to each Squadron. 418 Squadron practised Search and Rescue techniques at Penhold, Alta., during *SAREX 87*. 402 Squadron in conjunction with 418 Squadron participated in Exercise *Medley 87* at Cold Lake, Alta, to introduce instrument electrical technicians to high performance aircraft systems.

The units of 1 Air Reserve Wing (Montreal) and 2 Air Reserve Wing (Toronto) integrated into unified Total Force units in 1987. What used to be called 1 and 2 Air Reserve Wings are now titled 1 and 2 Tactical Aviation Wings. Integration of Regular and Reserve Force personnel into one unit is expected to occur with the remaining Air Reserve Group units in the future.

Considerable planning was initiated as a result of the defence White Paper, which emphasized the increasing importance of the Reserves. Anticipation of significant increase in Air Reserve manning, training and equipment and establishment of the Supplementary Reserve was the driving force of this planning.

PRAIRIE REGION

The commander of Air Command is also the commander of the Prairie Region, encompassing Alberta, Saskatchewan and Manitoba. Regional operations staff at Air Command Headquarters and in detachments at Regina, and Edmonton were involved in a variety of civil assistance operations, ceremonial activities and VIP visits during the year. They included the provision of:

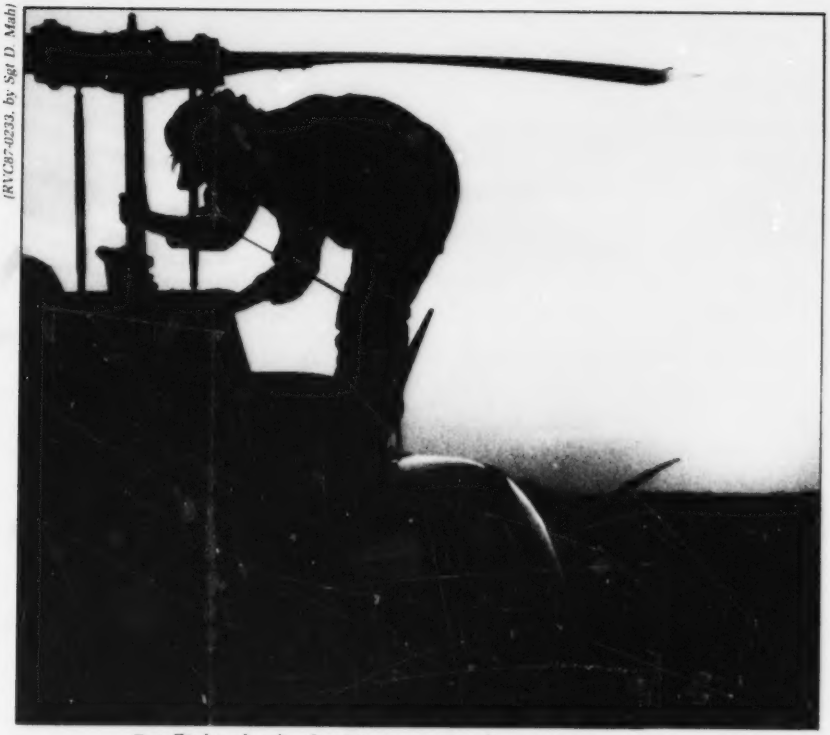
- ceremonial troops, bands and logistic support for the investiture ceremony of the Lieutenant-Governor of Manitoba, the royal visit of Her Majesty the Queen to Saskatchewan and the royal visit of the Duke and Duchess of York to Manitoba and Alberta;
- assistance to the City of Edmonton following the tornado disaster in August;
- assistance to Correctional Services Canada at Drumheller Penitentiary in June; and
- explosive ordnance disposal personnel from various bases in the region to provide assistance to the Royal Canadian Mounted Police in two operations.

CONSTRUCTION AND PROPERTY

During 1987 the Air Command construction program was valued at approximately $21 million. Significant projects included:

- provision of interim facilities for the CF-18 Detached Operating Base (DOB) at Goose Bay, Nfld.;

(RYC87-0233, by Sgt D Mah)



Pre-flight check of a Kiowa at Rendezvous 87.

- commencement of activities for the take-over of Transport Canada facilities at Goose Bay and their conversion for DND use;
- paving of runway and apron area for the Forward Operating Location (FOL) at Inuvik; N.W.T.;
- construction of hangar additions at CFB Cold Lake, Alta.;
- expansion of base supply facilities at CFB Bagotville, Que.;
- significant improvement of fire protection systems in flight line hangar facilities across Air Command;
- security fencing improvements at several key installations;
- construction of facility support for new Automated Data Aerospace Maintenance (ADAM) and Automated Base Accounting Control and Information System (ABACUS) computers;

- the renovation of facilities for 1 Construction Engineering Unit (1 CEU) at CFB Winnipeg;
- upgrading of the command post at CFB Cold Lake; and
- renovation of single quarters at CFS Goose Bay for Base Recovery Flight.

The construction engineering operations and maintenance budget for the year totalled $82 million. Major projects included:

- revitalization of various utility systems such as steam lines, water lines, electrical power lines and central heating plants;
- retrofit/renovation of aged infrastructure across the command;
- continuation of the energy conservation program which resulted in a significant reduction in heating energy use in Air Command;
- continuation of the environmental protection program that included asbestos abatement in facilities and a clean-up of hazardous materials; and
- continuation of the replacement of airfield lighting control panels at various airfields and the upgrading of aprons, taxiways and runways.

COMMUNICATION COMMAND

A communication operator at 764 Communication Squadron Detachment in Hull, Que.

(by WO V. Johnson)

ROLE

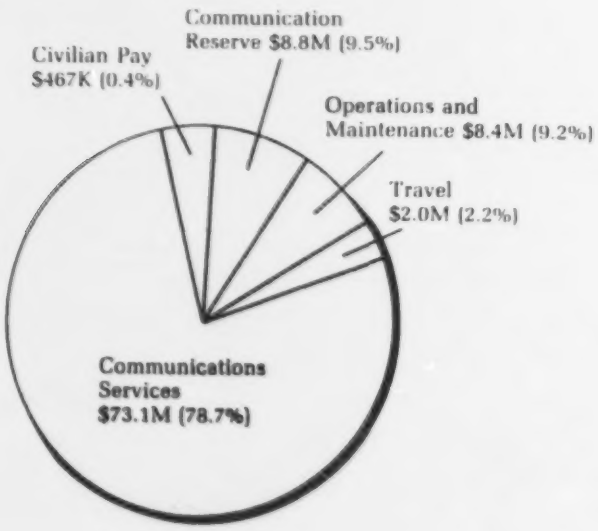
In 1987 the Canadian Forces Communication Command (CFCC) provided strategic communications services, as well as communications research and high frequency radio direction-finding services for the Canadian Forces. To effect these services the CFCC operated and maintained several communications and network systems.

PERSONNEL AND BUDGET

The Canadian Forces Communication Command's total personnel strength of 5,528 includes 3,300 Regular Force members, a Communication Reserve of 1,628 and a civilian force of 600.

The 1987 command budget was $92.8 million, of which $2.5 million were allocated to travel and to civilian pay, $8.4 million for operations and maintenance expenses, and $73.1 million (almost 80 per cent of the entire budget) for communications services. Expenses included long-distance telephone services and Canada's share of costs to ensure global communication access to the North American Aerospace Defence Command (NORAD), North Atlantic Treaty Organization (NATO) and Commonwealth partners.

CFCC Dollar Usage


Communication Reserve $8.8M (9.5%)
Civilian Pay $467K (0.4%)
Operations and Maintenance $8.4M (9.2%)
Travel $2.0M (2.2%)
Communications Services $73.1M (78.7%)

With the closing of Canadian Forces Stations Alsask, Alta.; Dana, Sask; Gypsumville, Man.; Sioux Lookout, Ont.; and Lowther, Ont.; CFCC detachments at those units ceased operations.

EXERCISES — OPERATIONS

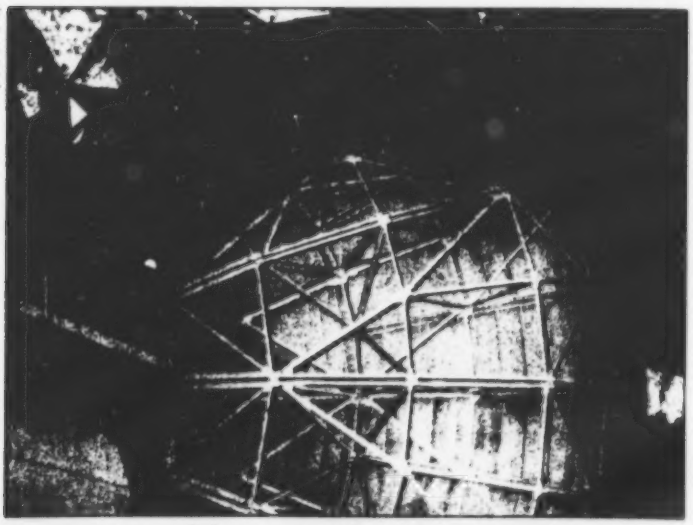
It is implicit in the provision of strategic communications for the Canadian Forces and emergency government that the organization be capable of extending services to the various military and civil headquarters during a national emergency. As well, it must supply reliable strategic communications from Canada to Canadian Forces combat elements anywhere in the world. To these ends, Communication Command personnel exercise their equipment and procedures regularly.

Exercises in 1987 ranged from a two-person two-day practice in support of Provincial Warning Centre operations in British Columbia to an exercise involving 45 communicators who set-up emergency communications for a Militia concentration in Valcartier, Que.

During April, in support of *Rendezvous 87*, the CFCC provided a Line of Communication unit composed of 80 Regular Force and 44 Communication Reservists. In addition, 12 Regular Force and 120 reservists augmented the 1st Canadian Signal Regiment (1 CSR), 10 Tactical Air Group (10 TAG) and 1 Field Support Hospital (1 FSH).

In November and December, 81 Regular Force members and 12 Communication Reservists set-up emergency communications at six different locations in the Arctic to exercise their skills in providing long-range communications in the North.

ISC 87-1961



Communications dish antenna at the NATO Integrated Communications System (Canadian Component) at CFS Carp, Ont.

In all, 4,472 Regular Force members and 4,191 Communication Reservists took part in 240 separate exercises of varying degrees of intensity and duration. In 1987, 136 members from four of the six communications groups also exercised their communication skills and equipment during eight adventure training exercises. The CFCC also provided 1,055 person-days in support of 15 other DND and non-DND activities.

TRAINING

In-service Training — Courses were conducted by the Canadian Forces for approximately 1,000 command personnel in 1987.

Out-service Seminars — Seminars and workshops funded by the command and contracted to commercial, professional and instructional agencies, were offered to 70 military and civilian command personnel in 1987. Out-service training covered a wide-range of subjects generally unavailable from departmental sources and ranging in length from one-half day to several weeks.

Civilian Training — Job-related, safety or security courses by the Public Service Commission or by professional, instructional agencies, were given to 160 command of civilians. These courses covered everything from first aid to developing management and supervisory skills.

In 1987, 306 Communication Reservists ranging in rank from private to lieutenant-colonel, and representing four communication groups, took part in four large-scale Mobile Command Militia Concentrations (MILCONs). A total of 239 Communication Reservists from two communication groups took part in

A radio technician sorting wire bundles in the communications node of the Automated Defence Data Network at CFS Carp, Ont.

several two-week Signal Concentrations combining Reserve resources to practise forming composite brigade signal squadrons.

Also, 90 officers and 269 non-commissioned members graduated from the various courses sponsored by CFCC Headquarters in the summer. Study included the full range of communications courses as well as security, administration, supply, finance and maintenance training.

Collective training was conducted at several locations and included training with the Regular Force Junior Leadership course and Senior Leadership course which takes place at the Canadian Forces School of Communications and Electronics, Kingston, Ont. Radio/teletypewriter operator courses Qualification Level 2 (QL 2) were held in Borden, Ont. by 70 Communication Group for their Communication Reservists; and 72 Communication Group operated a Communication Reserve school at Debert, N.S. in the summer offering training in radio/teletypewriter operator to QL 1 and QL 2, mobile radio detachment instruction and non-trade driver courses.

In trade courses conducted locally, a total of 188 reservists qualified to the first, or basic level, of radio/teletype operator, 107 qualified to QL 2 and another 33 qualified in the mobile radio detachment operation.

In conjunction with Employment and Immigration Canada, Communication Reserve units this year hired students to be trained in general military knowledge, dress, discipline, fieldcraft and basic communications skills. There were 469 graduates from the program.

A radio technician repairing an electronic component at CFB Ottawa.

ISC87-1101

CANADIAN FORCES EUROPE

CH-136 Kiowas from 444 Tactical Helicopter Squadron, CFB Lahr.

(IC587-466, by WO V. Johnson)

GENERAL

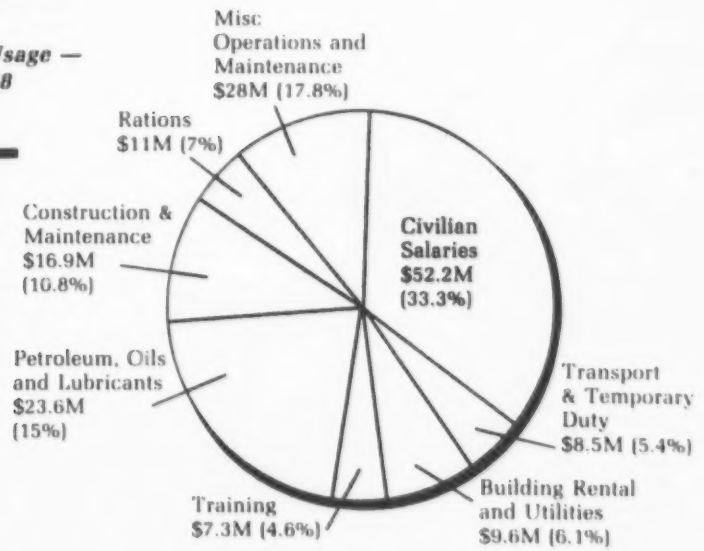
Canadian Forces Europe (CFE) continued in 1987 to fulfil Canada's NATO commitment by providing combat-ready land and air forces to the Supreme Allied Commander Europe (SACEUR). The two formations stationed permanently in Europe are 4 Canadian Mechanized Brigade Group (4 CMBG) and 1 Canadian Air Group (1 CAG). These formations carried out rigorous and realistic training programs to maintain the highest possible state of operational readiness. Canadian Forces Bases Lahr and Baden-Soellingen provided support for the two formations.

In 1987 the total number of service members assigned to CFE was 7,667. There are now about 20,000 military, civilian and dependant Canadians living in Central Europe.

BUDGET

During the fiscal year 1987-88, Canadian Forces Europe was allocated an operations and maintenance budget of $151.1 million.

CFE Dollar Usage — FY 87-88 Budget


Misc Operations and Maintenance $28M (17.8%)
Rations $11M (7%)
Construction & Maintenance $16.9M (10.8%)
Civilian Salaries $52.2M (33.3%)
Petroleum, Oils and Lubricants $23.6M (15%)
Transport & Temporary Duty $8.5M (5.4%)
Training $7.3M (4.6%)
Building Rental and Utilities $9.6M (6.1%)

OPERATIONS AND TRAINING

4 CMBG

During the annual active posting season, 4 Canadian Mechanized Brigade Group bid farewell to The Royal Canadian Dragoons and welcomed its new armoured regiment, the 8th Canadian Hussars (Princess Louise's).

Throughout 1987, the Commander of 4 Canadian Mechanized Brigade Group emphasized training to achieve operational readiness and tactical survivability. To realize this aim, the Brigade

Leopard tanks of "B" Squadron, 8th Canadian Hussars (Princess Louise's) on the Langenhard training area near CFB Lahr.

(Courtesy of Heinz Krieg from Lahr-Sulz, West Germany)

A soldier of the RCD checking his equipment before a battle-run during CAT 87.

(ILC87-6A, by Sgt R. Sanschagrin)

trained at numerous locations throughout the Federal Republic of Germany and Europe.

- 4 Canadian Mechanized Brigade Group made extensive use of the major ranges of NATO's Northern Army Group. The 1st Regiment, Royal Canadian Horse Artillery (1 RCHA) conducted practice camps in Munster South in April and May, and The Royal Canadian Dragoons (RCD) deployed to Bergen-Hohne for a gun camp in March. Both the 2nd Battalion, Princess Patricia's Canadian Light Infantry (2 PPCLI) and the 1st Battalion, Royal 22e Régiment (1 R22eR) conducted unit training in Sennelager in May.
- During June, The Royal Canadian Dragoons contributed to the CENTAG team that won the Canadian Army Trophy competition.
- 1 RCHA conducted a live firing practice camp in Grafenwohr, a major Bavarian-based U.S. range, during August.
- Brigade Group units also trained on ranges that are controlled by the German authorities. The 8th Canadian Hussars completed a unit concentration in Munsingen in August while 2 PPCLI nad 1 R22eR conducted small arms training at Heuberg in May.
- In September, the Brigade held its annual collective training exercise in Camp Hohenfels. The concentration culminated with a brigade group exercise using the laser integrated multiple engagement system (MILES). Borrowed from the U.S., MILES injects realism into engagements by simulating contacts in a safe but effective manner.

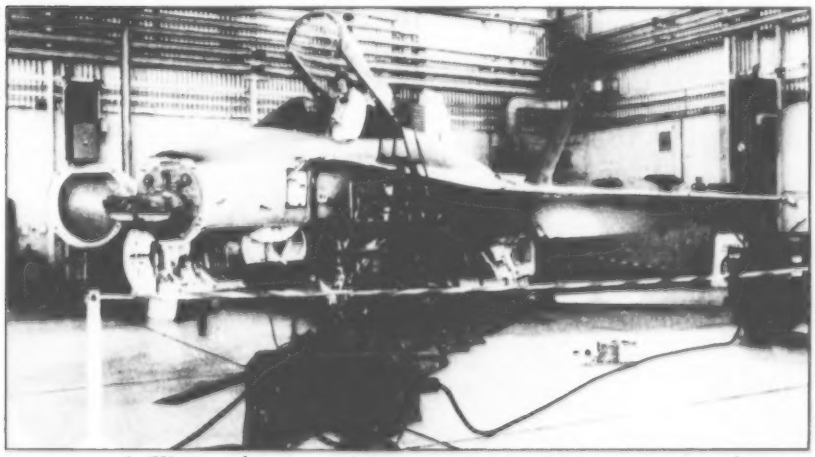
Soldiers of 4 CMBG using MILES equipment during an exercise in Hohenfels, West Germany.

- In October, the Brigade finalized its training year with a two-sided brigade exercise termed *Royal Sword*, involving supporting units from VII (US) Corps, II (GE Korps) and II Corps d'armée (Fr).
- 4 Canadian Mechanized Brigade Group continued to stress a high-level of physical fitness for its soldiers and in October held its annual sports meet. 1 R22eR won the major units' event for the thirteenth consecutive year and 4 CER took the title for the minor units.

1 Canadian Air Group

Canada's commitment to NATO Allied Air Forces in Central Europe (AAFCE) was fulfilled by three squadrons of CF-18 aircraft. Based at CFB Baden-Soellingen, 409 Night Hawks, 439 Tigers and 421 Red Indians Tactical Fighter Squadrons (TFS) trained in conventional air-to-ground and air-to-air operations as part of 4 Allied Tactical Air Force (4 ATAF). All three squadrons obtain operational support from CFBs Lahr and Baden-Soellingen and technical support from 1 Air Maintenance Squadron (1 AMS).

(BA86-512)



A CF-18 undergoes maintenance at 1 Air Maintenance Squadron, CFB Baden-Soellingen.

Throughout the year, pilots, ground crew and support personnel trained as a team for their wartime roles. The annual flying training program consisted of daily flying, NATO-generated offensive and defensive exercises, and a series of nationally-originated, monthly *Starfighter* exercises. Those exercises culminated in the yearly NATO tactical evaluation to assess operational effectiveness.

To be effective, NATO's air forces must operate as a cohesive unit. During 1987, 1 Canadian Air Group fostered this NATO tenet by participating in a variety of squadron exchanges and deployments.

Throughout these international operations, 1 CAG personnel were encouraged to exchange ideas and tactics with their allied hosts and whenever feasible to rehearse cooperative operations. 1 CAG's major exercises and deployments in 1987 included the following:

- 439 Tactical Fighter Squadron (TFS) was deployed to Rimini, Italy, in July to exercise with the F-104-equipped Gruppo 102 of the Italian Air Force. A reciprocal visit of the Italian squadron took place in Baden-Soellingen in September;
- 409 TFS was hosted by the F-16-equipped 723 and 726 Squadrons of the Danish Air Force in Aalborg, Denmark, in June. The return visit to Baden-Soellingen was in October;
- 421 TFS exchanged with 27 Squadron, equipped with *Tornadoes*, of the Royal Air Force in Marham, England. The return visit to Baden-Soellingen was in September;
- 409, 421, and 439 Tactical Fighter Squadrons attended air-to-air gunnery camps in Leeuwarden, The Netherlands;
- 1 Canadian Air Group participated in several major NATO live flying exercises in 1987, which included *Central Enterprise* in June and *Cold Fire* in September; and
- 439 Tiger Squadron was hosted for a *Tiger Meet* by a Portuguese fighter squadron, also "Tigers", equipped with G-91 aircraft.

The newness of the CF-18 in the European theatre continued to generate considerable allied interest in 1987, resulting in numerous extra taskings. This was particularly apparent during the period from mid-June to mid-September, when almost every weekend CF-18s participated in air shows from Scandinavia to Switzerland.

1 Air Maintenance Squadron continued to provide technical support to the three Baden-based CF-18 squadrons and to the CT-133 *Silver Star* aircraft of Base Flight. The completion of new facilities and the arrival of new test equipment throughout the year gave 1 Air Maintenance Squadron increased self-sufficiency in maintaining the CF-18. Major construction efforts commenced in 1987, aimed at reducing the vulnerability of aircraft and maintenance support installations.

During 1987, 1 Canadian Air Group continued to discharge its operational mandate while improvements and systems updates progressed on 1 CAG support and services facilities.

CFB Lahr

CFB Lahr provides administrative and logistical support to Canadian Forces Europe, serves as the peacetime garrison location for most 4 CMBG units, and is the Canadian Forces' primary strategic air terminus in Central Europe. As well, CFB Lahr enjoyed a successful NATO tactical evaluation as a deployed operating base for 439 Tactical Fighter Squadron.

During September and October, CFB Lahr supported Exercise *Coronet Phaser* which included Florida-based United States Air Force F-15 *Eagle* Air Superiority Fighters.

CFB Lahr is the Canadian Forces port of entry to Europe and, on its behalf, 5 Air Movements Unit handled more than 50,000 passengers and 5.9 million kilograms of freight, averaging 60 flights per month. The *Dash-8* aircraft, crewed by 412 Squadron Detachment, were introduced into CFE, replacing the *Dash-7*. Between the *Dash-7* and the *Dash-8* and the CC-130 *Hercules* permanently located in Lahr, more than 1,000 hours were flown in support of CFE missions.

A CC-142 Dash-8 aircraft from 412 Transport Squadron Detachment takes off from the Lahr airfield.

(ISC87-404, by WO V. Johnson)

CFB Baden-Soellingen

Throughout 1987 CFB Baden-Soellingen conducted fighter operations in support of NATO's Central Region. With 421 Squadron being officially declared combat-ready on November 30, 1986, 1 Canadian Air Group had three operational squadrons equipped with the CF-18 fighter. The culmination of a long, hard training year resulted in a successful NATO tactical evaluation of the base and the three squadrons.

To provide increased support to the operational capability of CFB Baden-Soellingen, construction proceeded at an unprecedented rate. New hardened aircraft shelters and aircraft maintenance facilities are now almost completed. They will provide protection and dispersion for both aircraft and new test equipment.

CONSTRUCTION AND PROPERTY

General

In addition to the normal construction and maintenance activities in support of Canadian Forces Europe, formations and units,

CFE military engineering staff were particularly active with numerous projects throughout the year including:

- the continuation of conversion to CF-18 operations;
- the property acquisition and design of facilities to accommodate the introduction of Low Level Air Defence units to CFE;
- the continued development of airfield damage repair capability in CFE; and
- the development of plans and acquisition of property in support of the 1987 White Paper on defence.

MAJOR PROJECTS COMPLETED OR IN PROGRESS

Construction in 1987 included:

- the commencement of construction of additional hardened aircraft shelters at Lahr and Baden-Soellingen;
- the completion of design and site preparation for the new $26.9-million CFE Hospital complex;
- the completion of 250 bulk lease housing units at Baden;
- the completion of 16 additional single quarters at Baden; and
- the commencement of design for the $25.9-million 1st Regiment, Royal Canadian Horse Artillery complex.

CF-18 Conversion

Over $9.6 million of NATO funds were recovered beginning in 1986 for those projects associated with the introduction of the CF-18 aircraft, where Canada pre-financed the construction work, as well as for NATO-eligible projects.

(BA882-731-1)

A third-generation hardened aircraft shelter (HAS) under construction at CFB Baden-Soellingen.

NORTHERN REGION HEADQUARTERS

Medics of the Canadian Forces using a Nodwell — medium over the snow vehicle — during Exercise Lightning Strike at Cape Dyer, N.W.T.

(ISC87-070-32)

ROLE

Situated in Yellowknife, N.W.T., the Northern Region Headquarters (NRHQ) was formed on the May 15, 1970 to assist in maintaining Canadian sovereignty and support Canadian Forces activities in the North.

PERSONNEL AND BUDGET

The strength of Northern Region Headquarters, including detachment personnel, averaged 80 Regular Force and civilian personnel located in Yellowknife and Whitehorse.

Seventy-five per cent of the region's $2-million annual budget was used to support the Canadian Ranger and cadet program including Cadet Camp Whitehorse. The remaining 25 per cent was used for operations and maintenance.

TRAINING

Increased emphasis on the Arctic during 1987 was felt by the Northern Region Headquarters as more land and air units came North to carry out air defence, tactical airlift and land force tactical exercises. In 1987, NRHQ provided planning advice and liaison support for 12 exercises including Exercise *Lightning Strike 87*, a joint air/army Task Force operation which took place in Eqaluit, Cape Dorset, and Cape Dyer, N.W.T.; this was followed by Exercise *Snow Pier*, a 600-man infantry exercise in Hay River, N.W.T.

The swearing-in of a young Canadian Ranger.

DETACHMENTS

The 16 members of the 440 Transport and Rescue Squadron Detachment participated in two missing person searches. One for a man in Hay River and another for a man near Summit Lake, Y.T., on the Yukon/Northwest Territories border. The detachment also transported Canadian Ranger, cadet and other staff to all parts of the region. In all, over 1,700 hours were flown by the two *Twin Otters* of this detachment.

RESERVES — THE CANADIAN RANGERS

The increased training in the North generated a corresponding increase in Canadian Ranger activities to support these exercises. Support was provided to eight exercises and some 330 Rangers carried out training at 21 locations during the year. All 35 Canadian Ranger active patrols received the annual ammunition resupply from the headquarters.

CADETS

The cadet movement *North of 60* is one of the few organized activities for youth in the North. Currently, some 610 cadets at 16 locations receive substantial physical fitness, citizenship and leadership training. A total of 282 cadets attended Cadet Camp Whitehorse in 1987 while 62 Northern Region cadets attended camps in the South. There are at present 84 officers on the Cadet Instructor List in the North.

Canadian Rangers during rifle practise at Coral Harbour, N.W.T.

CANADIAN FORCES TRAINING SYSTEM

Canadian Forces fire-fighters practice fire-fighting techniques at CFB Ottawa.

(UPC87-2168)

ROLE

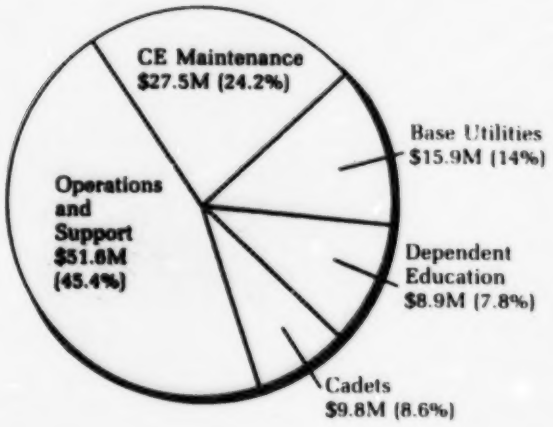
The Canadian Forces Training System (CFTS) provides designated individual training for service members to meet Canadian Forces needs. CFTS Headquarters is located at Canadian Forces Base Trenton, Ont. The Commander CFTS, Brigadier-General A.C. Brown is also the Commander Central Region. Training is carried out at 19 schools on five CFTS bases, and at two other schools on bases assigned to other commands.

PERSONNEL AND BUDGET

The CFTS budget of $113.7 million covered the cost of day-to-day functional and regional activities during fiscal year 1987-88. A significant portion of the budget was used to provide maintenance and utilities for CFTS schools.

Command personnel comprise 4,546 military members and 3,774 civilian employees. In 1987 almost 1,800 command personnel were employed as instructional staff. Another 500 military instructors from other commands served as incremental staff at the command's 21 schools.

CFTS Dollar Usage



INDIVIDUAL TRAINING

Within the broad role of providing individual training, the Canadian Forces Training System plans, controls and conducts all basic recruit and officer training, and complete training for 16 officer and 58 non-commissioned member military occupations that are common to more than one operational command. In addition, the Canadian Forces Training System conducts specialty and advanced training for most military personnel.

During 1987 more than 26,000 students graduated from 447 courses conducted by the command. These included:

- a total of 1,212 officer candidates who graduated from the CF Officer Candidate School at CFB Chilliwack, B.C.;
- 5,117 new entry non-commissioned members who graduated from basic recruit schools at CFB St-Jean, Que. for francophones and CFB Cornwallis, N.S. for anglophones;
- occupational training schools that produced 7,212 graduates; and
- a further 12,014 Canadian Forces members who graduated from a wide-range of advanced and specialty courses which included leadership, language and instructor training.

Officer cadets on the "confidence course" at the Canadian Forces Officer Candidate School at CFB Chilliwack, B.C.

LANGUAGE TRAINING

During 1987 the Canadian Forces Training System provided language training to more than 2,000 personnel at the three Training System Language Schools at CFB St-Jean, Que., CFB Borden, Ont. and Ottawa.

The majority of language training was given in English and French to fulfil the requirements of the Military Second Language Training Plan (MSLTP). Much of this training was given to new entry officers and NCM recruits; the remainder was given to serving members to meet on-going service requirements. In addition, a wide variety of foreign language courses were given to meet specific military needs.

TRAINING DEVELOPMENT

Throughout the past year the Canadian Forces Training System has continued to develop innovative approaches to training concepts, doctrine, management, conduct and technology. CFTS activities in these areas are conducted jointly by the Training Development Division at the headquarters in Trenton and the CF Training Development Centre (CFTDC) at CFB Borden. Projects undertaken in 1987 included:

- the implementation phase for the revision of the CF Manual of Individual Training;
- the introduction of courses for training managers and validators;
- the implementation of an overall approach for validating training for use within the CFTS; and
- the introduction of Computer Assisted Learning (CAL) into selected CFTS schools.

CFTS OPERATIONS

CFTS bases and units provide a wide-range of operational and support services to units belonging to other regions and commands. As members of base defence forces, CFTS staff and students contribute significantly to the operational effectiveness of the regions to which they are assigned.

During 1987, CFB Chilliwack provided support to the Commonwealth Heads of Government Meeting in Vancouver. Both CFB Kingston and CFB Chilliwack practiced deployments to Federal Penitentiaries in their area. Members of the CF Nuclear Biological Chemical School (NBCS) from CFB Borden deployed on Exercise *Brisk Wind* to Defence Research Establishment (DRE) Suffield to practice the NBC team procedures.

CENTRAL REGION OPERATIONS

Central Region Headquarters is located at CFB Trenton with a permanent operations detachment at CFB Toronto. The staff of Central Region Operations Detachment worked closely with federal and provincial governments and various police agencies to provide DND assistance and equipment for such activities as:

- logistic and administrative support during the royal visit of the Duke and Duchess of York to Ontario;
- logistic and administrative support to the *Warriors' Day Parade* associated with the *Canadian National Exhibition 87*;

- assistance and coordination of military air support for a possible evacuation of the residents of Big Trout Lake when a forest fire threatened the community; and
- assistance to police forces in the conduct of aerial searches for missing persons.

Routine operations included co-ordinating local support for VIP visits to Toronto, staffing agreements for local police forces to use DND facilities and working closely with Emergency Preparedness Canada and Emergency Planning Ontario on matters of joint military/civilian concern. Central Region's seven explosive ordnance disposal (EOD) centres continued to play a vital role, responding to some 150 requests for assistance in disposing of dangerous explosives, hazardous chemicals and military ordnance.

IHQ87-12-30, by Sgt M Rouil

A CC-115 Buffalo aircraft from 442 Transport and Rescue Squadron overflying land west of CFB Trenton.

CENTRAL REGION CADETS

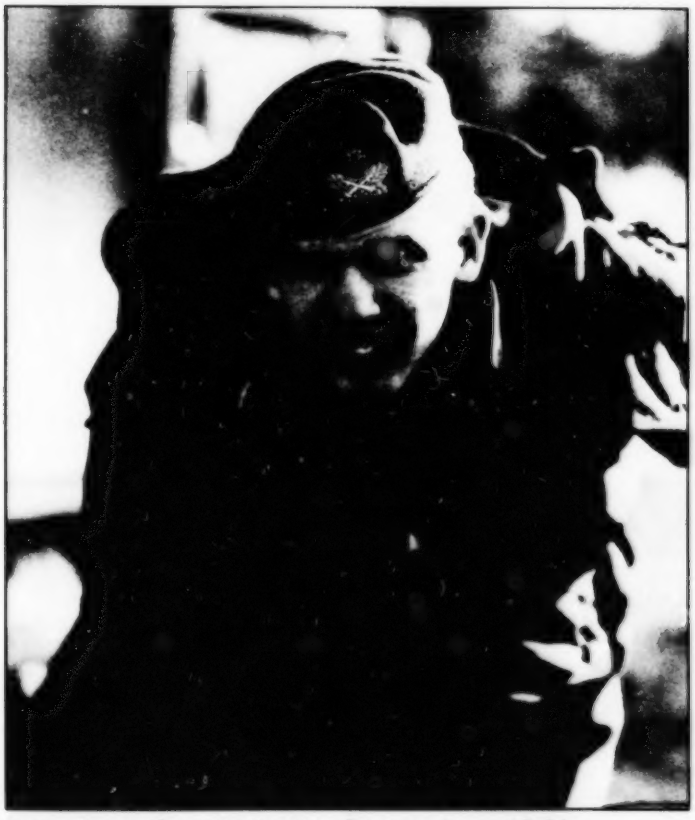
About 14,200 cadets belong to Central Region's 254 corps and squadrons. Instruction, administration and supervision are provided by 1,438 Cadet Instructor List (CIL) officers, assisted by 972 civilian instructors.

Cadet activities during 1987 included:

- summer camp attendance by 665 cadets at HMCS *Ontario* near Kingston while a further 298 sea cadets attended training courses offered in other areas of the country;

- sea training for selected cadets aboard the brigantine, *St. Lawrence II* and HMC Ships;
- summer camp attendance by 1,850 army cadets at Ipperwash Army Cadet Camp and Petawawa Cadet Training Centre while a further 128 army cadets attended training in other parts of Canada;
- weekend specialist training in skiing, canoeing and winter survival techniques for more than 487 CIL officers and senior cadets at four regional training centres;
- glider training for 1,600 air cadets at the Trenton Air Cadet Camp;
- training for 72 air cadets during flights between CFB Trenton, Ont. and Goose Bay, Nfld. with 436 Transport Squadron;

(by 2Lt R. Hutchingame)



Instruction to the region's 254 cadet corps is provided by 1,438 officers of the Cadet Instructors List.

- a tri-service cadet camp for 429 cadets in the Cadet Summer Training School, CFB Borden including 100 cadets attending the Cadet School of Music, Borden; and
- training of over 2,500 officers and cadets at the region's 12 sailing centres, seven gliding centres and four land operations training centres.

CFTS MAJOR CONSTRUCTION ACTIVITY

CFB Borden. An addition to the Food Services Training Building was completed at a cost of approximately $5 million.

CFB St-Jean. A $1-million outdoor track and field activity was constructed.

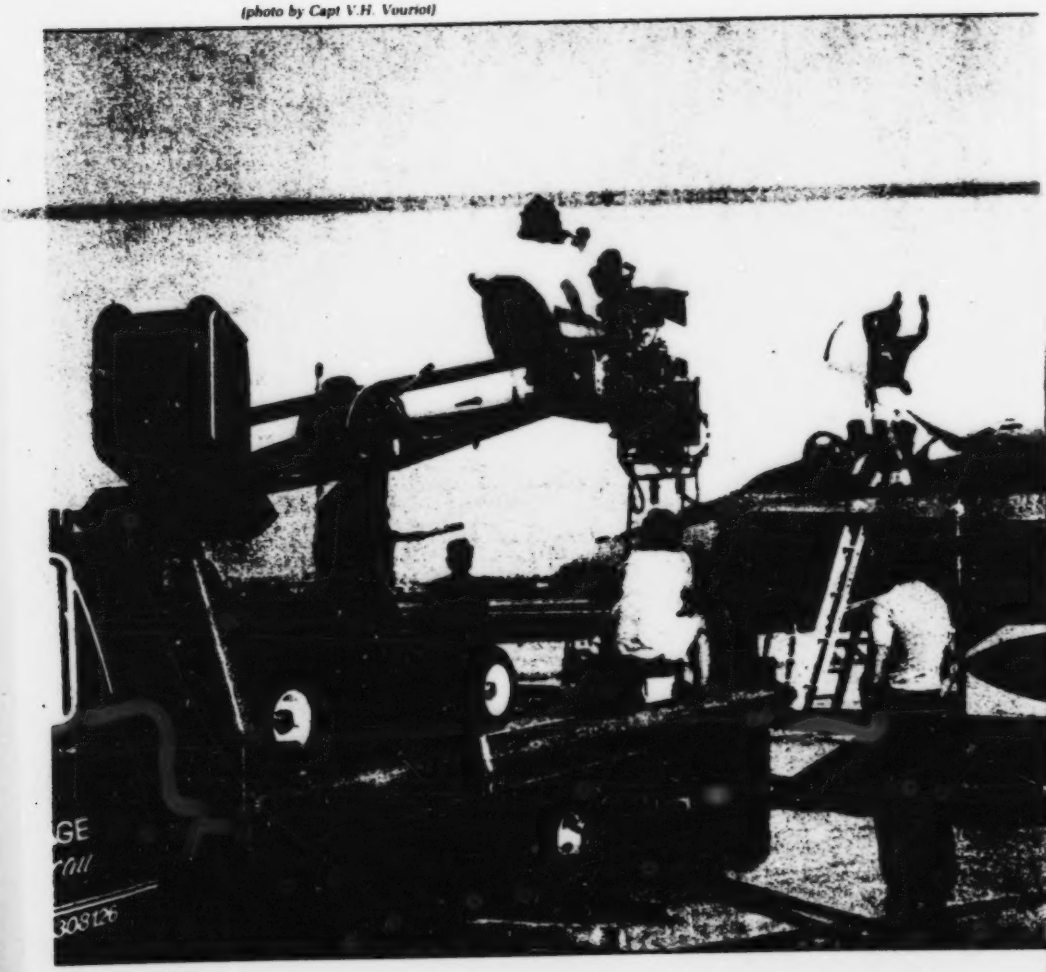
CFB Chilliwack. A $7-million Armoury is being constructed in Richmond, B.C. to support 12 Service Battalion (Militia).

The five CFTS bases have a Plant Replacement Value (PRV) of $1.8 billion including approximately 1,400 buildings and about 3,000 Married Quarters.

PEOPLE AND PEOPLE PROGRAMS

Filming the "CF-18 Scene" for the T.V. commercial "The Dream".

(photo by Capt V.H. Vouriot)



DND/CF PERSONNEL

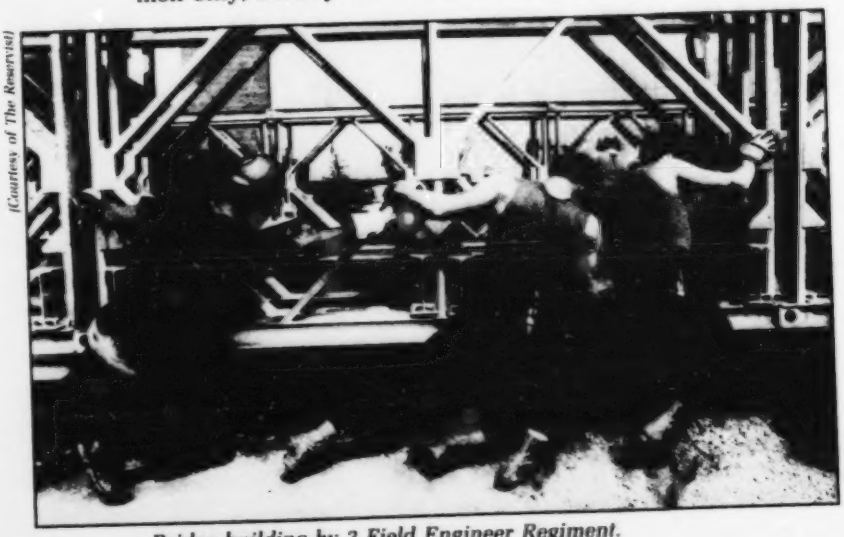
In 1987 the Canadian Forces consisted of 85,750 Regular Force members, 24,700 Primary Reserve members and 29,000 Supplementary Reserve members. In addition to these, the Department of National Defence (DND) employed 32,588 civilians. There were also 8,592 non-public funds (NPF) employees working in Canex facilities, base messes and other areas.

RECRUITING

During the year, 7,100 Canadians enrolled in the Regular Force. An additional 44 were recruited under the Youth Training and Employment Program (YTEP) to train and serve with the Regular Force for one year. This marked the completion of YTEP. A total of 11,692 were enrolled under the program since its inception in 1983. A large percentage of YTEP graduates transferred to the Regular Force.

Officer recruitment was again emphasized this year in response to increased manning levels in several occupations. Women now constitute 15 per cent of officer enrolments. The academic and aptitude test standards of new entrants, both officers and non-commissioned members, continued at the high-level of recent years.

During 1987 the Canadian Forces began recruiting women for many occupations which had been traditionally considered for men only; notably those in the combat arms and the navy.



(Courtesy of The Reservist)

Bridge building by 2 Field Engineer Regiment.

The Northern Native Entry Program (NNEP) continued to enjoy an increasing level of interest among northern native youths and their families. During 1987, the majority of the northern native communities were visited by NNEP coordinators. Forty-four native applicants accepted positions on the two Pre-Recruit Training Courses held at Canadian Forces Base Penhold, Alta. and Canadian Forces Station Goose Bay, Nfld. Two Native Cultural Awareness Courses were also held to expand awareness of cross-cultural problems encountered by recruiters, trainers, and supervisors supporting the program.

A new recruiting television commercial was produced in late 1987, with the objective of expanding the applicant base for the Forces' Subsidized University Entry Plans. The advertising program also featured magazine and transit ads publicizing the wider range of employment opportunities for women in the Canadian Forces.

(by Capt V.H. Vouriot)

A mixture of actors and Canadian Forces soldiers performing in the "Combat Leadership" scene during the filming of "The Dream". This commercial was aired on major networks in 1987. Note the camera on the left moving along the track.

WOMEN IN THE CANADIAN FORCES

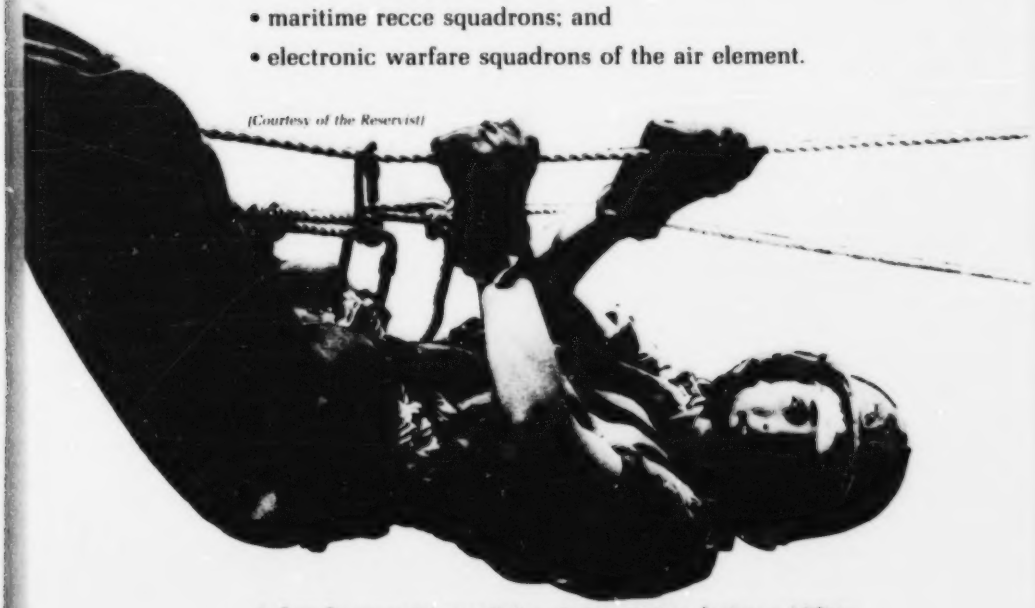
Opportunities for women to serve in Canada's Armed Forces have continued to expand over this past year. As a result of recommendations made by the Charter Task Force, 75 per cent

of the occupations in the Canadian Forces are now fully open to mixed gender employment.

Specifically, as of late 1986, the following areas were opened to women:

- auxiliary oiler replenishment (AOR) vessels;
- service battalions;
- field ambulances;
- military police platoons;
- maritime patrol squadrons;
- maritime recce squadrons; and
- electronic warfare squadrons of the air element.

(Courtesy of the Reservist)



A female reservist practising river-crossing during a Militia concentration.

In February 1987, on the recommendation of the Charter Task Force, the Minister of National Defence announced the creation of a Combat Related Employment of Women (CREW) program management office. This office was tasked with examining the areas of military employment that are still male dominated. As a result of their deliberations and in view of the air force's successful mixed gender employment trials, all restrictions regarding the employment of women in air units were removed. Consequently, operational units such as CF-18 fighter squadrons and tactical helicopter squadrons are now open to women.

At present, the following are still designated single gender units: infantry, artillery, armour, field engineer, signals, field intelligence and naval destroyers. Trials shall, however, take place in these areas of employment over the next few years to assess the effect of mixed gender employment on unit operational effectiveness. For trial purposes, active recruiting to enrol women in land and sea combat occupations is currently taking place.

This year marked another notable achievement in the employment progress of women in the Canadian Forces. In June 1987, Colonel S.A. Hellstrom was promoted to the rank of brigadier-general and therefore became the first woman to attain general status in Canada.

CANADIAN MILITARY COLLEGES

There are three colleges within the Canadian Military College (CMC) system: Royal Military College of Canada (RMC), Kingston, Ont.; Royal Roads Military College (RRMC), Victoria; and Collège militaire royal (CMR) in St-Jean, Que.

Most officer cadets enter the Canadian Military College (CMC) system through the Regular Officer Training Plan (ROTP). At the beginning of the 1987-88 academic year, 1,375 of whom 210 were women, were enrolled in Canadian Military Colleges under this plan.

To meet the total requirement for officers with degrees, another 410 ROTP students were enrolled in undergraduate degree programs at civilian universities across Canada for the 1987-88 academic year.

INDIVIDUAL TRAINING

Individual training is provided by formal courses, by on-the-job training or by a combination of the two. The student flow through formal courses alone for the fiscal year 1986-1987 was 69,612 with the allocation of this training being assigned as listed in the following chart.

Maritime Command	8,739
Mobile Command	10,956
Air Command	13,495
Training System	28,342
Other	1,940
Out-Service	6,140
Total	**69,612**

TRAINING DEVELOPMENT

The role of a Training Development Officer (TDO) in the Canadian Forces is to act as a catalyst to bring about improvements in training and training development activities. To achieve this, Training Development Officers are employed in a variety of jobs in National Defence Headquarters and at Canadian Forces schools, bases and commands. In addition to their routine functions associated with implementation of the CF Individual Training System's approach to training, some of the major projects TDOs are currently involved in are:

- the establishment of regional audio-visual production centres;
- the development of computer-assisted learning (CAL) for basic electronics training;
- the production of an interactive game for maritime electronic warfare applications;
- the production and/or revision of training procedure manuals;
- the development of a computer-based training system for second-language teaching; and
- the provision of training development advise to such major Crown projects as the Low Level Air Defence, the Canadian Patrol Frigate, the Tribal Update Modernization, and the Canadian Submarine Acquisition programs.

INTERNATIONAL ATHLETIC PARTICIPATION

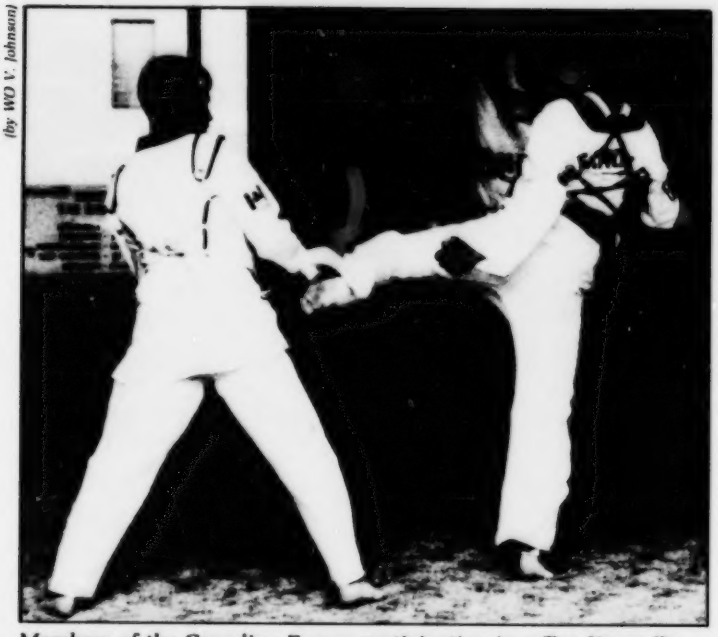
Conseil international du sport militaire

Throughout the year Canada continued to be an active member of the Conseil international du sport militaire (CISM). The Council, with its headquarters in Brussels, Belgium, has an aim to contribute to world peace by encouraging friendly relations among the military forces of its numerous international members.

In 1987 atheletes of the Canadian Forces participated in the Council's biathlon at Autrans, France; cross-country running at Brazilia, Brazil; volleyball at Ankara, Turkey; golf at Pensacola, Florida and Tae Kwan Do at Seoul, South Korea.

Canadian Forces Sports Award Program

In 1987, the Canadian Forces Sports Award Program was established to recognize serving and former members of Canada's Armed Forces who brought recognition to themselves and honour to the Canadian military in the field of sports. It is comprised of two degrees: the CF Sports Hall of Fame and the CF Sports Honour Roll.



(by WO V. Johnson)

Members of the Canadian Forces participating in a Tae Kwan Do practice.

Canadian Forces Sports Hall of Fame

In 1987, Officer Cadet Michael Ashcroft was inducted into the Canadian Forces Sports Hall of Fame for small-bore rifle shooting.

PHYSICAL FITNESS

Exercise prescription was introduced into the CF EXPRES Program. The prescription is a series of training guides, given to participants, that are designed to assist members in directing and controlling their physical fitness program.

ACCOMMODATION FOR PERSONNEL

As part of the ongoing emphasis on improving accommodation for military personnel, 1987 major capital construction included: junior ranks single quarters in CFBs Halifax; Kingston, Ont.; Valcartier, Que.; Esquimalt, B.C.; Bagotville, Que.; and Baden, West Germany; 100 married quarters in Bagotville; 250 in Baden and an extension to the Officers' Mess in Borden, Ont. Additionally, 72 homes in Goose Bay, Nfld., were re-opened for family accommodation.

PERSONNEL SUPPORT PROGRAMS

Non-public fund grants totalling $2 million were made in 1987 to build or upgrade recreation facilities at 33 bases and stations. Projects funded under the grant program included: squash courts at Holberg, B.C.; Masset, B.C.; Suffield, Alta.; Shilo, Man.; and Montreal; playgrounds at Bagotville, Que.; Barrington, N.S.; and Edmonton; hobby shops at Greenwood, N.S.; and Portage, Man.; cross-country ski trails at Petawawa, Ont.; and fitness trails at Suffield, Alta.; Portage, Man.; and Chilliwack, B.C.

In addition to these grants, an additional $13 million of non-public funds were made available from local resources and long-term loans for other projects to improve messes, resale facilities, curling rinks and marinas.

As over 65 per cent of military personnel live on bases or in rural areas where they must use base facilities, recreation, messes and other non-public facilities, services play a vital role in their morale and well-being.

A Canadian Forces member taking part in physical fitness training at NDHQ.

(ISC87-083, by Sgt T. Smith)

EDUCATION OF DEPENDENT CHILDREN

During the 1986-87 school year, the DND Dependents School System operated 57 schools in Canada and nine overseas. Staffed by 1,061 members of the teaching profession, the schools accommodated 14,488 dependents at both elementary and secondary levels. In Canada, DND paid for an additional 4,527 dependents attending municipal schools. The overseas school system served 3,606 Canadian students.

Gross costs for educating children for the fiscal year 1986-87 was $82.2 million. DND received a rebate of about $13 million in provincial grants and tuition fees paid by non-entitled pupils attending DND Dependants Schools.

CIVILIAN PERSONNEL ADMINISTRATION

The civilian work-force in DND, as part of a single defence work force, collaborates with the Canadian Forces to achieve defence policy objectives. Civilian employees of DND, numbering approximately 35,000, form the largest department in the Public Service. They are managed and administered in accordance with legislation, policies, objectives and management values of the Public Service of Canada.

The personnel administration service and programs for civilian DND employees place DND in the forefront of effective human resource recruitment, development and utilization. Specific programs offered to civilian employees will enable them to achieve their potential while continuing to effectively meet changing departmental operational requirements. Some of these programs include:

- the ongoing departmental *staffing program* that made 14,000 appointments during the past year of which 12,000 were for periods of short duration, for seasonal requirements and for special employment programs;
- *a work-force reduction program* to effect the redeployment of employees affected by the closure of 17 CADIN-Pinetree radar sites over a three year period. This has resulted in the appointment of 416 CADIN-Pinetree civilian employees to other units of DND or to other federal departments;
- the *training and development* of the civilian work-force is recognized as an investment in productivity. Maintaining and developing knowledge and skills in a era of changing technology, new equipment programs, and re-focussed goals, requires committed effort. The department's commitment has resulted in a four-fold increase of the civilian training budget to a current level of $38 million. For example:

During the past year, the *General Labour and Trades Program* has been expanded to permit the increased participation of women in non-traditional occupations. Mandatory orientation programs for managers have continued; courses such as staff officer training, instructional techniques training, and correspondence preparation training have been expanded. The tuition reimbursement program has been significantly financially enlarged, and an improved educational leave policy has been introduced as another method to foster the acquisition of new skills and knowledge by DND civilians, and

The *Employee Assistance Program*, with its network of 400 referral agents, responded to the personal problems affecting job performance of over 2,000 employees. The *Retirement Planning Program* provided about 90 courses involving a total of over 2,300 employees and spouses;

- the *Civilian Career Management System (CCMS)* which focuses on matching employees developmental needs to departmental needs. The system currently includes employees in the Management, Scientific and Professional, Administrative and Foreign Service and Technical categories. The latter category is expanding in the CCMS and during the past year approval was granted to include the Electronics (EL) Group in the system. The *Defence Scientist Personnel Program* serves a 'career corps' of research and development scientists in DND. During this year, a new *Post-Graduate Training Program* for these employees has been successfully utilized;
- *Affirmative Action Programs* that ensure the equitable representation of women, indigenous people, disabled persons and visible minority groups. To achieve this, DND adopted a recruitment strategy by which specific referrals of target group members for open competitions are requested by management. During the past year two audio-visual productions were developed. The first was developed to assist managers in integrating target group members into the civilian work-force; while the second was designed to encourage women to enter non-traditional occupations. Over the past year, the representation of women in DND increased to 33.9 percent of the civilian work-force; indigenous representation was maintained at 0.5 percent. A slight decrease was observed in the representation of disabled persons;
- *Human Resource Planning* which assists management in ensuring the acquisition and maintenance of a qualified work-force, while providing for organizational continuity and productivity. Highlights of this past year included the development of a departmental civilian multi-year human resource plan, and development of a base-level human resource planning process;

- *Quality of Worklife Program* (QWL) which was extended to three new bases this year, bringing to four the number of participating bases, and increasing the number of involved military and civilian personnel to over 5,000. In addition, a QWL training package "Building Effective Teams" was completed and 50 employees were qualified as QWL instructors. As Canadian Forces bases progress with QWL implementation, direct and indirect program results are expected in improved communication, enhanced participation, improved job satisfaction and increased productivity. QWL is generating considerable interest throughout DND and ways extending the program are being evaluated; and
- the *Classification Program*, by which positions are categorized into occupational groups and sub-groups which recognize the relative importance of their duties within organizations. This included the participation of DND in the updating of 45 classification standards in conjunction with the Treasury Board Secretariat (TBS). In addition, the departmental classification program has been extended to include delegated authority previously retained by the Treasury Board Secretariat in order that improved classification service can be provided to DND management.

OFFICIAL LANGUAGES

DND's official languages program is designed to satisfy the linguistic requirements of military and other federal government objectives as well as the needs and aspirations of its civilian employees, military personnel and their dependants. During 1987 the main activities of the Director General Official Languages were oriented toward giving a new impetus to the Department's official languages program as well as making commanders and managers more aware of their responsibilities in this area.

Activities in 1987 included:

- the publication of the revised military order respecting official languages (CFAO 2-15);
- the publication of the updated information booklet for military personnel on official languages;
- the publication of the revised civilian personnel order regarding language training (CPAO 9.06);
- the publication of the revised civilian personnel bulletin on the confirmation procedures for the bilingualism bonus (CPAB No. 4/87);

- the final drafting stages of the publication of the civilian order concerning the language requirements of civilian positions (CPAO 4.23);
- the publication of information bulletins on official languages for civilian employees of the Department;
- the initiation of a review of the language requirements of all military and civilian positions throughout the Department;
- the revitalization of the Official Languages Coordinating Committee and the formation of the Executive Committee on Official Languages;
- the conduct of an independant management audit of the DND Official Languages Program;
- the preparation of a new official languages policy document to be published after proclamation of the new official language legislation (Bill C-72); and
- the provision of interim guidance on priority of bilingual manning of military positions.

NATO Terminology Conferences and French Language Books

DND again participated in the annual NATO Terminology Conferences. The French-speaking Nations' Panel meetings were held in Paris, France, and the English-speaking Nations' Panel meetings took place in London, England. Following these separate discussions, the joint NATO Military Terminology Conference convened in Brussels, Belgium, in May. Because Canada and NATO have the same two official languages, Canada was the only member country that participated in all three NATO terminology meetings.

In September, DND sponsored another exhibition of French language technical books. Some 6,000 commercial publications were displayed at the Royal Military College in Kingston, Ont. This exhibition gave DND instructors the chance to review commercial French language textbooks on a wide-range of subjects. The purchase of commercially available French publications eliminates the need for expensive translation of English textbooks on the same subjects.

Military Second Language Training Plan (MSLTP)

MSLTP continued to evolve with the development of a new French curriculum designed to enhance the ability of an individual to use the second language in a military environment. New language proficiency examinations (LPE) have been designed as

an appropriate certification instrument to determine an individual's second language capability in the military milieu. The language proficiency examinations are scheduled for introduction in the Canadian Forces in April 1988.

Over the past year, a redistribution of the human resources within MSLTP has been completed and now provides an effective military administration network combined with a consolidation of teaching resources. Throughout this period, the teaching staff, particularly at the largest language school, located in St-Jean, Que., has been augmented by several experienced teachers from the Public Service Commission.

In 1987, 1,759 military personnel (471 in French and 1,288 in English) undertook courses of classroom structured Second Language Training (SLT). In addition to this, the Department continued to provide Second Language Training to numerous Officer Cadets in the Canadian Military Colleges, General and Senior Officers in Canada and on foreign postings as well as Subsidized Second Language Training and correspondence courses to numerous Canadian Forces members and Departmental employees.

This year, the Conference of the Bureau for International Language Coordination (BILC) was held in Lisbon, Portugal from June 22 to 26. Canada delivered several presentations at this conference. BILC, an international organization of 13 NATO countries, was created to ease the exchange of information on developments in language training.

MEDICINE PROGRAMS

Tobacco Smoking Reduction

A new policy was developed to reduce and ultimately eliminate tobacco consumption in DND workplaces. The Canadian Forces *Butt Out* program was adopted by Health and Welfare Canada for application to Federal government personnel.

Drug and Alcohol Abuse

The Drug and Alcohol Prevention Program was formed and trained a specialized team of educators to undertake a pilot project designed to enhance primary and secondary prevention strategies. By applying new experiential training methods (in place of traditional didactic presentations) the team hopes to optimize the education of Canadian Forces personnel as a first-line step towards reducing abuse of drugs and alcohol.

Obesity

In keeping with a University of Waterloo contract, and advice drawn from the National Task Force on the Treatment of Obesity,

the Directorate of Preventive Medicine has completed the design for a new program to assist Canadian Forces members who are overweight or obese. Called W.A.E.T. (Weight and Exercise Training) this program combines elements of behaviour modification, nutrition, and physical activity. The Directorate of Medical Treatment Services developed a new table of weight standards (based on body mass index) to encourage personnel to continually assess and maintain their ideal body mass.

NON-PUBLIC FUND (NPF) EMPLOYEES

In 1987, there were about 8,600 non-public fund (NPF) employees in the system, including 1,700 working in Canadian Forces Europe. NPF employees work in various CANEX outlets (snack bars, service stations, grocery stores, restaurants, expressmarts and retail stores), tend bars, officiate at sports events, provide day care services and perform a myriad of other jobs in support of base recreational, community and social activities. Portions of the NPF work-force have been unionized since 1978. There are currently 41 bargaining units at 29 bases or stations across Canada. The Public Service Alliance of Canada (PSAC) represents 23 of these bargaining units and United Food and Commercial Workers Union (UFCW) is certified in 18 bargaining units.

CEREMONIALS

Ceremonial parades continued to present a high-profile public image of the Canadian Forces in 1987. Highlights included support for royal visits, such as Trooping the Colour of the Black Watch during the June visit of the Queen Mother and mounting guards for the francophone summit in Quebec City in September.

The Queen Mother celebrating The Black Watch of Canada's 125th anniversary in Montreal.

(IMC 87-274)

Music was provided by nine Regular Force professional bands, 66 Reserve Force bands and 38 voluntary bands. To support this activity more effectively, the Canadian Forces School of Music was moved to a central location at CFB Borden, Ont., from its previous site on the West Coast at CFB Esquimalt.

MILITARY FAMILY LIFE/WORK STRESS SURVEY

Three reports prepared by the Directorate of Social and Economic Analysis on the Military Family Life/Work Stress Survey were analyzed during the year by a senior review board at National Defence Headquarters.

The survey of over 3,000 married and single-parent families was designed to identify areas of stress and well-being, to determine how families were coping with life in the Canadian Forces, and to highlight the role families play in influencing a member's work performance.

The findings confirmed that most military families cope well with demands of service life, but that there were some areas where improvement could be made. These areas are being analysed and a Military Family Support Program has been initiated to design and establish a systematical approach for the coordination and planning of the family support required in the Canadian Forces. Some excellent military family support centres already exist at such major bases as Cold Lake and Calgary, Alta.; Halifax and Greenwood, N.S.; and Gagetown, N.B. All have a commitment to support the particular needs of military families in their area, and rely on a combination of fulltime, and volunteer staff to make their programs work.

EQUIPMENT, CONSTRUCTION AND ITEMS OF INTEREST

The Minister visiting Saint John Shipbuilding Ltd. during the construction of a Canadian Patrol Frigate.

(IHC87-019-3)

GENERAL

Defence expenditures for 1987 were widely distributed across the Canadian economy and had a significant impact on industrial activity. This chapter outlines the more prominent acquisition and construction activities for 1987. Also included are various other items that are the responsibility of the Assistant Deputy Minister for Material (ADM[Mat]).

EQUIPMENT

Canadian Patrol Frigate (CPF) Project

The first three warships of the $5-billion Canadian Patrol Frigate Project are currently in various stages of construction. HMCS *Halifax*, the leadship, reached a major milestone on March 19, 1987, when the first of the 26 erection units that constitute a frigate, was lowered into the Saint John Shipbuilding Ltd. (SJLS) drydock. Over half of this vessel's modular erection units have been welded together and most of the remaining units are in the final stages of assembly.

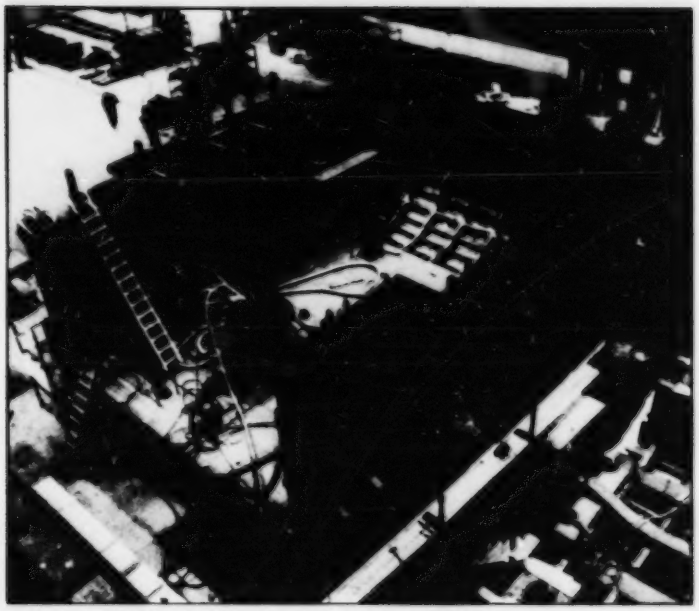
The application of the modular construction technique allows for a high degree of equipment outfitting prior to the units being joined together in the drydock. This process yields a high quality product constructed in a cost-effective manner.

HMCS *Halifax*'s propulsion system, which consists of the two LM 2500-30 gas turbines and a single Pielstick cruise diesel engine, has already been installed in the engine room modules as part of the drydock assembly. This first ship is scheduled to be floated up in April 1988, after which it will complete outfitting and begin trials. The navy will take possession in October 1989.

SJSL commenced fabrication of the second ship, HMCS *Vancouver*, in December 1986, and will start construction of HMCS *Toronto*, the fourth ship, early in the new year. SJSL's subcontractor, Marine Industries Ltd., began construction of the third ship, HMCS *Ville de Quebec*, in its Sorel, Que. shipyard in May 1987. The last of the program's six ships will join the fleet in 1992.

Paramax Electronic's Inc., the Montreal-based combat systems design, development and integration subcontractor, has completed outfitting the Combat Systems Test and Support Facility. A complete set of combat systems equipment is contained in a 1,440 sq metre shielded room. Combat systems testing and integration began this year and all major equipment and weapons are under contract and in various stages of delivery.

The construction of the Personnel Training Facility, started in June 1986 at Canadian Forces Base Halifax, has been completed. Initial crew training is scheduled to begin in mid-1988.



A segment of the hull of a Canadian Patrol Frigate being assembled at Saint John Shipbuilding Ltd, Saint John, N.B.

The project continues to remain within budget and industrial benefits are exceeding contractual commitments.

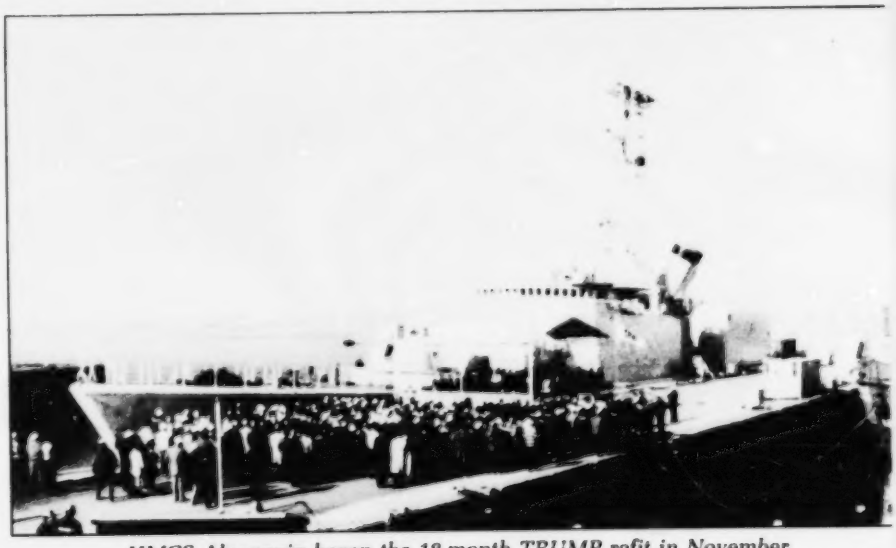
In December, a contract amendment with the prime contractor was concluded to procure an additional six frigates of the same basic design, ensuring a smooth uninterrupted delivery of twelve combat-capable surface warships for Canada's naval forces through to 1996.

Tribal Class Update and Modernization Project (TRUMP)

TRUMP will update and modernize four DDH 280 *Tribal Class* destroyers to protect other ships in anti-air warfare (AAW) with the latest in missile and electronic technology while retaining their existing anti-submarine warfare (ASW) capability.

This $1-billion project was awarded to Litton Systems Canada Ltd. in June, 1986. The contract includes items such as spares and training in an integrated logistics package. The Project Management Office in Ottawa is staffed by Canadian Forces personnel and civilians from the Department of National Defence, Supply and Services, and Regional and Industrial Expansion who work with the contractor to ensure timely completion of the work.

TRUMP completed System Design in September 1986, Preliminary Design in March 1987 and the Critical Design Review activities in December 1987. HMCS *Algonquin* commenced the 18-month refit/moderization in November 1987, followed in sequence in yearly intervals by HMC Ships *Iroquois*, *Athabaskan* and *Huron*. Training of specific personnel on the new equipment will start in 1988. This training will occur at several locations in Canada, the United States and Europe in preparation for the first ship to begin sea trials and for the Fleet School Halifax to assume full responsibility for TRUMP.



HMCS Algonquin began the 18-month TRUMP refit in November.

Other Ship Refits and Construction

Ship refitting for Canada's steam destroyers, three replenishment ships, three conventional submarines and numerous auxiliary and support craft cost $22 million for 1987-88 fiscal year.

Future plans include the construction of four 30-meter vessels from 1988 to 1990. These ships will be used for sound measurement, torpedo target simulation, mobile acoustic target interrogation and monitoring oceanographic data. In 1988 delivery will start of improved Anti-Submarine Warfare Martime Air/Sea Torpedoes to replace the current supply.

During 1987 the Canadian Forces acquired two Rigid Inflatable Boats (RIB) for use at the Canadian Forces Maritime Experimental and Test Range to fulfil a Canadian commitment with the United States. The RIBs were provided by Zodiac Marine Ltd.

Twelve infantry assault boats required by Canada's land forces have also been procured. These boats will be used in Canada and Europe.

Ship refitting for Canada's 20 destroyers, three replenishment ships, three conventional submarines and numerous auxiliary and support craft cost $22 million for the 1987-88 fiscal year.

For the Destroyer Life Extension (DELEX) project, all of the 16 refits have been completed except for the fitment of a few late equipment deliveries. The 'other' ship refits are in progress; four more are scheduled for the fiscal year 1988-89, and one submarine refit will be completed in 1987-88. This will replace approximately $28 million directly into the hands of private shipyards plus additional monies to companies for material procurement. DND Ship Repair Units will also receive refit work benefiting approximately 2,650 employees. Work is progressing on the procurement of four 30-metre Torpedo Ship Range Vessels for the West Coast range. For the Naval Reserve Modernization Project, option studies are in progress to determine the vessels and equipment required to meet the coastal defence responsibility. Priority has been placed on the acquisition of approximately 12 vessels to be used for training and nine for countermeasure operations.

Dash-8 and Challenger Aircraft

A contract was awarded to De Havilland Aircraft of Canada Limited in August 1985 for six *Dash-8* aircraft at a cost of $98 million. Two utility passenger/cargo aircraft, designated the CC-142, entered in service in early 1987 with transport and communication duties in Europe. They replaced the two CC-132 *Dash-7* aircraft operated by 412 squadron at CFB Lahr, West Germany.

Deliveries of the four *Dash-8* Navigation Trainers, designated the CT-142, are scheduled for 1988-89. They will replace the four specially equipped CC-130N *Hercules* aircraft currently performing that duty at the CF Aerospace Navigation School in Winnipeg. The project involves the development and integration into the aircraft of a computerized navigation training system that will permit each student navigation console to be electronically independently controlled by an instructor. The system will also facilitate the introduction of new or enhanced navigation aids and techniques into the training program.

In 1985, DND acquired 12 *Challenger* aircraft and associated support at a total project cost of $211 million. The final five *Challengers* were delivered in 1987. With this procurement, the Canadian Forces will operate a total of 16 aircraft. This is the the largest *Challenger* fleet in the world.

ISC87-046 by WO V. Johnson

A CC-144 Challenger from 412 Transport Squadron in flight near Ottawa.

Four CL-601 long-range GE-powered aircraft were delivered during 1987 and have replaced the CC-117 *Falcon* in the Administrative Flight Services (AFS) role of 412 Transport Squadron at CFB Ottawa (Uplands). These aircraft can also be configured for medical evacuation. Eight additional AVCO Lycoming-powered CL-600 aircraft have also been purchased. One CL-600 will serve as an Avionics Testbed Aircraft at the Aerospace Engineering Test Establishment (AETE) at Cold Lake, Alta. The remaining seven CL-600 aircraft will be reconfigured under another project to replace the EC-117 Falcon at 414 Electronic Warfare Squadron, North Bay, Ont. in the CF Electronic Support and Training (EST) Systems role.

Tactical Air Navigation Replacement Program

In May 1985, Leigh Instruments Ltd. of Ottawa was contracted to provide 60 state-of-the-art Tactical Air Navigation (TACAN) beacon systems to replace obsolescent DND and Transport Canada systems.

TACAN provides military and civilian aircraft with a ground-based enroute and approach navigational aid system. Delivery is scheduled for January 1988 through August 1989.

CF-18 Fighter Project

1987 marked the fifth year of CF-18 operations. By the end of December, 121 CF-18 aircraft had been delivered to Canada from the McDonnell Douglas plant in St. Louis, Missouri. Deliveries will continue at the rate of approximately two per month until the 138th aircraft is received in September, 1988.

The CF-18 fleet is replacing the CF-101, CF-104, and CF-5 aircraft. Operation of the CF-101 ended in late 1984, with the exception of a specialized electronic warfare training version. The CF-104 retired in early 1986, while CF-5 aircraft committed to NATO will be withdrawn during 1988-89.

CF-18 aircraft are now operating from Cold Lake, Alta., Bagotville, Que., and Baden-Soellingen, Federal Republic of Germany. 410 Operational Training Squadron (OTS) at CFB Cold Lake is graduating about 26 pilots every six months. Newly qualified pilots are used to increase the manning of the five existing squadrons. Over the next two years, one more squadron will be formed at CFB Bagotville and one at CFB Cold Lake.

In 1987, many of the new facilities for maintenance of the aircraft's complex system were commissioned. DND, for example, accepted the Integrated Test Facility built under contract by Canadian Aviation Electronics (CAE), and with it, a capability to fully manage the software program running on the numerous avionic computers. At CFB Bagotville and CFB Baden, work continues on the last of the required facilities for full CF-18 support.

In 1987, the prime contractor McDonnell Douglas, again exceeded commitments in providing offset benefits to Canadian industry via investment and technology flow into Canada from the U.S. Between 1977 and 1995, McDonnell Douglas is committed to providing $2,910 million of offset benefits. The cumulative value of benefits totalled $2,277 million, or 157 per cent of the target figure million the manufacturer was expected to reach, by mid-1987.

North American Air Defence Modernization

In 1987, five long-range radars (LRR), were installed in the Western Arctic at renovated Distant Early Warning (DEW) Line sites. These radars were linked via Anik D satellite to the new Region Communications Centre (RCC) in North Bay, Ont. They were then integrated with the Canadian NORAD Region's Canada West Sector Operations Control Centre (SOCC) and declared operational near the end of the year. Also in 1987, six new radars were shipped to locations in the Eastern Arctic to prepare for installation in 1988.

Construction of three new LRR sites (one on Baffin Island and two on the Labrador Coast) proceeded on schedule with a completion date set for 1988. Construction of the test facility for the developmental short-range radar (SRR) has also begun near North Bay, Ont. Testing of this prototype will begin in 1988. Thirty-six SRR sites will be installed in Canada between 1991 and 1992 to enhance low level cruise missile detection capability.

Air defence technicians from Canada and the United States monitor radar display screens in the Regional Operations Control Centre at CFB North Bay, Ont.

Projectile Tracking Radar

In April 1986, Vitro Services of Florida was contracted to provide a Projectile Tracking Radar for installation at the Proof and Experimental Test Establishment (PETE) at Nicolet, Que. The new radar will replace one borrowed from the U.S. Army and will improve the accuracy and safety with which PETE performs its engineering and quality assurance services. When the radar becomes operational in August 1988, it will measure the flight and ballistic characteristics of various artillery munitions undergoing evaluation.

Forward Operating Locations (FOLs)

In 1987, Inuvik, Yellowknife, Rankin Inlet, and Iqaluit in the Northwest Territories and Kuujjuaq in Quebec were selected as Forward Operating Locations. When complete, these sites will enable fighter aircraft to operate within their coverage of the North Warning System.

Manning

The first assignment of Canadian military personnel to the Over-the-Horizon Backscatter (OTH-B) radar site at Bangor, Maine occurred in 1987. Also, Canadian participation was increased in Airborne Warning and Control System (AWACS) crews at Tinker AFB, Oklahoma and Elmendorf AFB, Alaska.

CONSTRUCTION

General

DND carried out a $250-million construction program during 1987. In addition, $233 million was spent on operating and maintaining utilities, buildings and other infrastructure at bases and stations across Canada and Europe.

Major Construction

Projects completed in 1987 for DND by Defence Construction Canada included:

- an extension of facilities at the CF Command and Staff School in Toronto;
- new junior ranks' quarters at CFB Kingston, Ont.;
- 100 new quarters for married personnel and an 80-room barrack block at CFB Bagotville, Que.; and
- new single quarters for non-commissioned members at CFB Halifax and at CFB Valcartier, Que.

Construction in progress in 1987 included:

- a construction engineering complex at CFB Petawawa, Ont.;
- a naval fuel storage facility at Prince Rupert, B.C.;
- a military hospital in Lahr, West Germany;
- a torpedo fuel facility at CFB Halifax;
- additional hardened shelters for CF-18 aircraft at CFB Lahr and CFB Baden-Soellingen, West Germany;
- jetty improvements at CFB Halifax;
- junior ranks' quarters at CFB Borden, Ont.; and
- replacement of lightning system regulators at several Canadian Forces airfields.

Construction Design

Defence Construction Canada arranged consultant contracts to prepare designs and estimates for numerous projects including:

- an equipment and vehicle maintenance facility for the 3rd Battalion, PPCLI at CFB Esquimalt, B.C.;
- single quarters for officers at CFB Halifax;
- a new dining facility for cadets at Collège Militaire Royal, CFB St-Jean, Que.;
- a climatic simulation facility at the Defence and Civil Institute for Environmental Medicine, CFB Toronto;

- a main Base Supply facility at CFB Halifax;
- a CF-18 hangar at CFB Bagotville, Que.;
- a gymnasium extension for recruit training at CFB Cornwallis, N.S.;
- a replacement ship maintenance jetty at CFB Esquimalt, B.C.; and
- a combined mess facility at CFB Summerside, P.E.I.

Design work continued on several projects including:

- a Base Operations building at CFB Bagotville, Que.;
- new facilities for 1 Combat Engineer Regiment and for the CF School of Military Engineering at CFB Chilliwack, B.C.;
- a major Combat Training Centre at CFB Gagetown, N.B.; and
- 166 juniors ranks quarters and an on-shore facility for the Fleet Maintenance Group, CFB Esquimalt, B.C.

Reserve Facilities

The construction program in support of the Reserves has continued. The following milestones included:

- the awarding of a construction contract for a new armoury in Springhill, N.S., for the Nova Scotia Highlanders;
- Treasury Board approval to proceed with the design for a new armoury at St-Malo, Que.; and
- the commencement of design on construction at CFB Kingston, Ont. to accommodate an Electronic Warfare capability.

Support to Equipment Programs

The North Warning System continued to dominate the military engineers construction program.

- The access road at the Cartwright, Nfld. site was completed. All buildings at the site were erected and closed in;
- All satellite ground terminal work was completed, including the heavy terminal in North Bay, Ont.;
- Modifications of the underground facility in North Bay were completed;
- Construction was started on the prototype radar west of North Bay;
- Five long-range radar sites were completed; and
- Detailed field surveys were done for all short-range radar sites, and design work was started.

Construction in support of other equipment acquisitions included:

- low-level air defence facilities at CFB Chatham, N.B. and CFB Baden-Soellingen, West Germany;
- completion of several projects related to CF-18 support;
- jet-engine test facilities at CFB Shearwater, N.S. and Chatham, N.B.; and
- a building extension and renovation at CFB Bagotville, Que. for 3 Field Technical Training Unit.

1 Construction Engineering Unit

Winnipeg-based 1 Construction Engineering Unit (1 CEU) provides quick response, fourth line construction engineering services — including design, project supervision and engineering assistance — and the organizational nucleus for a mobile construction work-force wherever the Canadian Forces are deployed.

During 1987, 1 Combat Engineering Unit engaged in 59 engineering projects involving everything from soils analysis and sewage treatment facilities to water treatment and structural analysis. In addition to working in all parts of Canada in support of the Canadian Forces, engineering teams assisted Parks Canada in determining the feasibility of raising a gold mining dredge at Dawson City, Y.T. and designed accommodation for the United Nations in the Middle East.

The 1 CEU also undertook 36 production projects ranging from timber truss repairs through aircraft arrestor gear installation in Europe and Canada to the continuing reconstruction of CFS Alert on the northern tip of Ellesmere Island. Five of these projects were in support of the North Warning System, a project for which 1 CEU is the short-range radar (SRR) station design authority. This involved: design and construction of the prototype SRR and a heavy communication terminal at North Bay and eight satellite ground terminals across the North; and the preliminary survey and briefing consultants for the detailed site adaption of their SRR design to 36 remote sites across Northern Canada.

New Dockyard Fire Hall — Halifax

September 23, 1987 marked the beginning of the official usage of new Dockyard Fire Hall at Canadian Forces Base Halifax. The new fire hall replaces one of the oldest buildings at the Dockyard. Several structural fire fighting apparatuses will be housed in this modern building. The Fire Prevention Bureau and the Fire Department Headquarters will also be located in the new building.

TRANSPORTATION AND POSTAL SERVICES

Materiel Movement

The DND materiel movement system utilizes all modes of military and commercial transportation to meet the Canadian Forces operational, training and administrative lift requirements.

The replenishment of northern military sites is accomplished using commercial ships to move fuel supplies and materiel as far north as ice conditions permit. When necessary and possible, military aircraft then ferry supplies to their final destinations. From July 1, 1986 to June 30, 1987 3.2 million litres of fuel were airlifted to CFS Alert. Also, 373.8 tonnes of materiel were sealifted to Thule, Greenland from Montreal, and then airlifted to CFS Alert for *Operation Boxtop II*. During this same period 1,924 tonnes of resupply materiel was sea or airlifted to CFS Alert, CFS Goose Bay, CFS Inuvik, NRHQ Detachment Whitehorse and NRHQ Yellowknife.

(by Capt J. Lussier)

The sign post at the most northern inhabited settlement in the world.

From July, 1986 to June, 1987, commercial shipping and military aircraft were used to move the following ammunition, military stores and equipment, personal belongings, and vehicles to and from Canadian Forces Europe:

- to CFE — 2,586 tonnes by airlift; and 6,157 tonnes by sealift; and
- from CFE — 1,773 tonnes by airlift and 6,126 tonnes by sealift.

DND arranged travel for 368,000 air passengers between July 1, 1986 and July 1, 1987.

Personnel

Transportation of personnel and their property in support of the department's commitments is provided by integral DND transport and commercial transportation.

Although Canadian Forces members are moved by all modes of transport, Canadian Forces aircraft provide the primary means. Between July 1, 1986 and July 1, 1987 DND undertook:

- the carriage of 286,000 passengers aboard regularly-scheduled and special flights (36,800 of these were transatlantic passengers destined for Canadian Forces locations in Europe, Cyprus, the Middle East and major exercise deployment);
- the expenditure of $30.8 million on commercial air charter; and
- the expenditure of $3 million on commercial charter.

In support of these moves about 13,113 passport and visa applications were processed by the DND passport cell in co-operation with the Department of External Affairs.

In support of personnel movement, DND undertook 24,353 shipments of furniture and effects weighing 54.2 million kilograms, including 1,100 automobiles, as well as 26 mobile homes at a cost of about $57 million. DND also arranged for the long-term storage of 7,734 lots of furniture and effects weighing approximately 14.1 million kilograms at a cost of $4.6 million.

Vehicle Accident Rate

The Canadian Forces accident rate for the first two quarters of 1987 was 1.57 preventable accidents for 160,000 kilometers of vehicle operation. This rate is identical to the rate for the first and second quarters of 1986.

Safe Driving

A total of 9,589 Canadian Forces military and civilian personnel and military dependents were given the Defensive Driving Course (DDC) in the year ending June 30, 1987. During the same period, 66 new DDC instructors were trained.

Also in 1987, 26 Master Driver Awards were given to military and DND civilian professional drivers who had achieved over 21 years of accident free driving. Since the program's inception in 1971, 955 Master Driver Awards have been presented.

The annual CF Professional Drivers Championship for professional military and civilian drivers was held at CFB Borden from September 14 to 16. The four classes of competition were tractor-trailer, straight truck, bus and road-rally. The grand aggregate award was won by the Canadian Forces Europe region team.

Postal Services

During 1987 the CF Postal Service (CFPS) operated 14 military Post Offices in Canada and 17 Canadian Forces Post Offices outside Canada in support of NATO commitments and the United Nations Forces in Cyprus and Golan Heights.

Other activities during 1987 included the CFPS moving in excess of 29,000 bags of DND mail weighing 330,700 kilograms. In the same period the CFPS moved more than 74,000 bags of Canada Post mail, weighing 1,050,700 kilograms. Postal financial revenues on the sale of stamps, money orders and other postal services exceeded $8.9 million.

DNS 87-20 by Sgt T. Smith

A civilian employee sorting mail at the National Defence Headquarters' mail room.

EXPLOSIVE ORDNANCE DISPOSAL (EOD)

During 1987, more than 505 requests for assistance were received at the 24 Explosive Ordnance Disposal (EOD) centres across the country. Each centre is manned by Canadian Forces members on a voluntary secondary duty status and can call upon a standby team any time.

Seventy-five per cent of all calls received at EOD centres involved the recovery of stray military ammunition. Requests to dispose of commercial explosives and hazardous chemicals, as well as to render safe Improvised Explosive Devices (IEDs), were also handled.

In 1987, the Canadian Forces continued a long-standing training arrangement with the Canadian Police College. Thirty-six Canadian police officers, along with Canadian Forces students, attended IED courses at the Canadian Forces School of Electrical and Mechanical Engineering at CFB Borden, Ont.

ENVIRONMENTAL PROTECTION

In 1987 initial environmental evaluations (IEE) were completed for the 11 long-range radars initiated for the 36 short-range radars which are components of the North Warning System. Arrangements have been made to finalize the IEEs for two Strategic Air Command low-level routes in western Canada, IR910 and IR920. A consultant contract was awarded to prepare an Environmental Impact Statement required by the Environmental Assessment Panel, reviewing proposed military activities in Labrador and adjacent parts of Quebec. Environmental Baseline Studies were completed for CFB Cornwallis and CFB Greenwood, N.S. These studies provide a form of audit to assess the overall impact of the base's activities on the environment. In addition, a similar study of CFB Gagetown, N.B. is in progress.

The Natural Resources Management Section is arranging for the completion of forest inventories and management plans for several Canadian Forces properties located in Nova Scotia. Forestry operations are being carried out at numerous establishments across Canada. As part of an ongoing program, 120 civilian employees were trained in pesticide application and improved grounds management.

RESEARCH AND DEVELOPMENT

General

The Chief of Research and Development (CRAD) is responsible for the provision and management of a national program of defence research and development and scientific consultation services that provides effective and timely support to the Canadian Forces. CRAD fills the roll of chief scientist of the Department, pinpointing problems, helping set priorities and helping shape policies that are sensitive to scientific and technological change. CRAD is also responsible for the management of the research and development activities, resources and facilities of six Defence Research Establishments (DREs). The 1987-88 research and development (R&D) capital program was more than $230 million. About half that amount was spent on research and development contracts awarded to industries and universities, and on work performed on behalf of DND by other government departments and agencies on a cost-recoverable basis. The other half was devoted to research equipment, salaries, and operations

and maintenance at the six Defence Research Establishments (DREs).

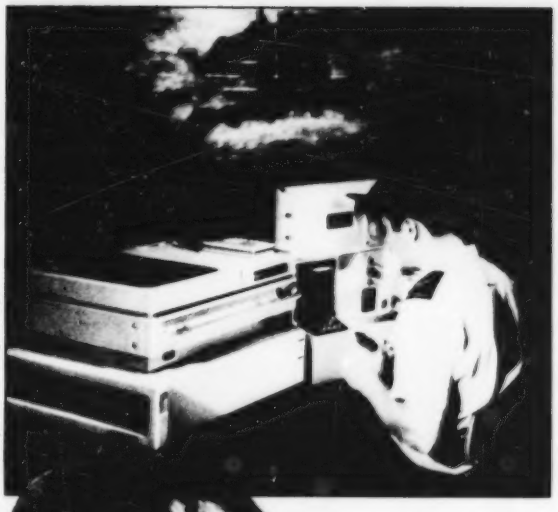
Service to the Canadian Forces is provided by CRAD staff both in Ottawa and at the Defence Research Establishments. A balanced program exists to ensure that scientific support is available to assist in the identification and selection of military equipment to replace existing hardware. Scientific projects exist for most of the major procurement programs currently in progress.

Canadian Forces Auxiliary Vessel (CFAV) Quest is an oceanographic research vessel used in defence research projects.

The new defence policy announced in the White Paper imposes several additional responsibilities upon the Department of National Defence, all of which will require research and development in numerous areas such as operations under northern sea-ice; communications; satellite surveillance; human performance, especially in the North; expert systems; and computer-assisted learning methods.

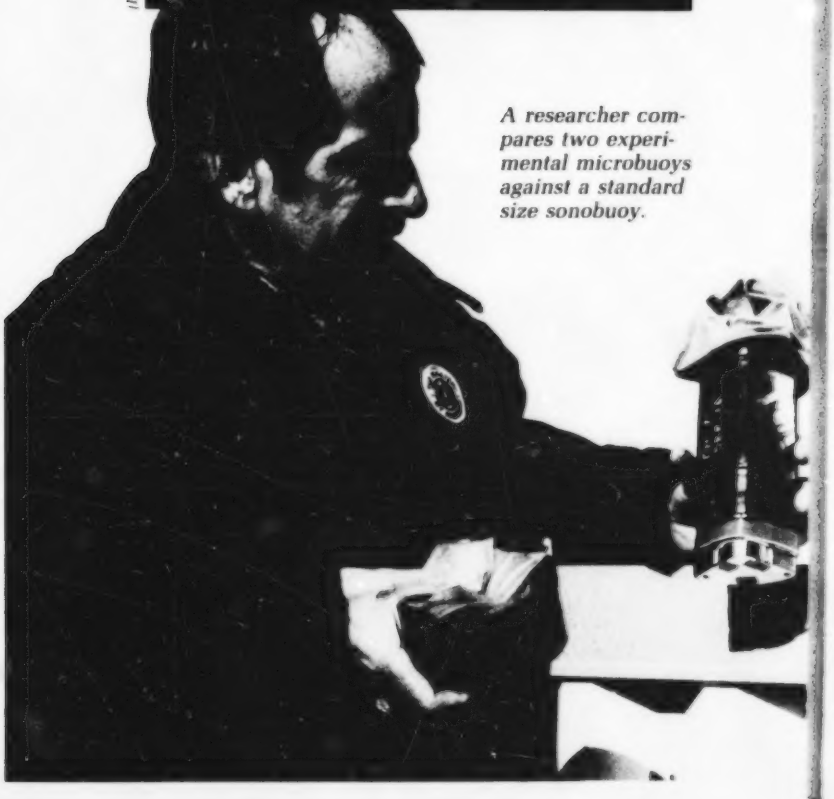
Within the NATO Alliance, major initiatives have resulted in the commencement of a number of cooperative development projects involving Canada. The projects cover technology areas principally related to weapons, command and control, and communications. Canadian industrial participation in these international projects is expected to be substantial. For example, support

The MK-60 Gunnery Trainer — Video disc technology for tank simulation training.



(DCIEM photo by MCpl Kelly)

A researcher compares two experimental microbuoys against a standard size sonobuoy.



of the international cooperative development of the Autonomous Precision Guided Munition will involve an expenditure of $75 million by Canada over the next 10 years. This significant international collaboration in advanced ammunition development is but one of several upcoming projects in all the environments that will become increasingly important in development of defence equipment in the future. The majority of these funds will be spent in Canadian industry.

Sea, Land and Air

In cooperation with Canadian Sonobuoy manufacturers, the Defence Research Establishment Atlantic (DREA) has been exploring the feasibility of developing small sonobuoys known as microbuoys. Sonobuoys are expendable passive acoustic listening devices used for the detection of submarines. The information is radio-linked back to an aircraft or ship. These simple, relatively low cost sensors typically would be deployed in large numbers to detect the quiet submarines of the mid-1990s. DREA has carried out sea trials to evaluate the experimental buoys and plans to carry out evaluation trials with the new designs during the fall of 1988.

For many years the Defence Research Establishment Pacific (DREP) has been pioneering research work in underwater submarine surveillance in the ice-covered waters of the Canadian Arctic. Areas of investigation include ambient noise, under-ice acoustic propagation and associated studies on the unique and harsh Arctic environment. The level of effort for this research will increase to meet the requirements of the three ocean navy.

In times of war or emergency, the threat of mines along Canadian coasts could be formidable, therefore the recent introduction of the Mine Countermeasures program at DREP is expected to play an important role in meeting the mine threat. The DREP program will help to identify cost-effective solutions in mine hunting through research and development projects in navigation, sonar image processing, and system integration.

At the Defence Research Establishment Valcartier (DREV) a testbed has been developed to define the Canadian requirement for computer aids in the Operations and Intelligence cells at an army brigade field headquarters. The work continues towards a fieldable testbed.

Encouraging feasibility studies of new-generation prototype Infra-Red (IR) decoy flares at DREV have led to the formulation of a development plan for a pyrophoric flare/dispenser system. This system, when developed, would offer increased protection of aircraft from heat-seeking missile threats.

Communications Research and Development

The sophisticated engagement simulation facility, at the Defence Research Establishment Ottawa (DREO), permits simultation of missile attacks on ships and aircraft and the effects of electronic countermeasures. The facility is used to determine the best countermeasures to be deployed by the self-protection equipment carried by Canadian ships and aircraft. It is also used to determine the effectiveness of new countermeasures techniques being developed at DREO.

In collaboration with Canadian industry, DREO continues to develop technology in advanced microwave and millimeter wave receivers and signal processors for a mid-life refit of the Canadian Electronic Warfare System (CANEWS) fitted to ships of Canada's navy. These enhancements will enable CANEWS to meet threats expected to appear into the next century. Some of the technology will be applicable to other major defence resources such as the CF-18 and the CP-140 *Aurora* aircraft.

To address future Department of National Defence secure communication requirements, a major research and development project is underway at DREO to develop technologies and equipment for an Extremely High Frequency (EHF) Satellite Communications System. The majority of the work will be contracted to Canadian industry, with supporting research being performed by the Defence Research Establishment Ottawa and the Communications Research Centre of the Department of Communications (DOC).

In support of DND, the Communications Research Centre is also completing the final trials of a transportable satellite communications terminal designed for use with the commerical ANIK-C satellite. This terminal will be used across Canada as a demonstration and evaluation communications centre.

Human Performance Research

The Defence and Civil Institute of Environmental Medicine (DCIEM) carried out studies on the toxicity of weapons' exhaust and developed a model for measuring the intensity of potential carbon monoxide poisoning within armoured vehicles. In studies aimed at the treatment of burns, in-house research focused on the role played by burn toxin, while contract research addressed problems associated with major burn injuries. A new burn dressing is now on clinical trial.

A new helmet and mask for CF-18 and CF-5 aircrew has been developed and the equipment is now in service. Activity addressing Physiological Problems of Aerospace Environments included a York University study using a nine-foot diameter sphere to study the false sensation of body rotation in the presence of a moving visual field. This work has implications for